THE

AMERICAN JOURNAL OF PHARMACY.

OCTOBER, 1852.

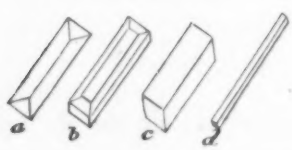
OBSERVATIONS ON THE VOLATILITY AND SOLUBILITY OF CANTHARIDIN IN VIEW OF THE MOST ELIGIBLE PHARMACEUTICAL TREATMENT OF SPANISH FLIES.

By William Procter, Jr.

Cantharides have been used in Pharmacy since the days of Hippocrates. It was not till 1810, however, that the principle giving them activity was isolated by Robiquet (Annal. de Chimie lxxvi. 302,) and subsequently named *Cantharidin* by Dr. Thomas Thompson. Since then various experimenters have been engaged in the chemical investigation of these flies, and in the more recent treatises they are stated to consist of *cantharidin, yellow fixed oil, green fixed oil, a yellow viscous substance, a black matter, ozmazome, uric acid, acetic acid, phosphoric acid,* and the *phosphate of lime and magnesia.* It is proverbial among apothecaries and physicians, that the pharmaceutical preparations designed to produce vesication, vary very much in their power as prepared by different individuals, and from different samples of cantharides by the same recipes. Is this variableness of power due to the inequality of strength of the commercial drug? or, are we to attribute it to the treatment employed by the apothecary? The real importance of these queries demands an answer. To proceed properly, the investigator should examine cantharidin in a pure state, ascertain how far the statements of writers are cor-

rect, then by a series of analyses, quantitative as regards that principle, determine whether its proportion varies, and to what extent, in different specimens of cantharides of fair quality; and finally to test the preparations derived from the same samples and see how far they correspond with the inferences drawn from the ascertained properties and proportions of the active principle. I have at present undertaken to resolve but a part of these queries—yet by far the most important ones—as will be seen.

Cantharidin is a white, neutral substance, of which the formula according to Regnault is $C_{10}H\,O_4$. Gmelin considers it of the nature of a solid volatile oil. As usually seen it has the form of minute flattened four-sided prisms (*c*,) much broken up, so as to appear like scales. When deposited from an ethereal solution of cantharides by slow evaporation, or from its solution in hot acetic acid by cooling, it assumes the form of flattened oblique four-sided prisms with dihedral summits, derived from the rectangular prism by the bevelment of its edges (see fig. *a* and *b* from *c*.) The crystals by slow sublimation are four-sided rectangular prisms of great brilliance and sometimes iridescent, *c* & *d*.



Solubility. Pure cantharidin is insoluble in water hot or cold. It is slightly soluble in cold alcohol, readily so when hot. Ether dissolves it to a greater extent, yet much more easily hot than cold. Chloroform is its best solvent, cold or hot, as shown in a former essay (Am. Jour. Pharm. vol. xxiii. 124,) and will remove it from the aqueous infusion of the flies. Acetic ether dissolves cantharidin, especially when hot, but does not retain much on cooling. When one part of cantharides is mixed with 20 parts of olive oil and heated to 250° Fahr. it is completely dissolved. As the solution cools, the cantharidin rapidly separates in shining needles in such quantity as at first to give the oil a pulpy consistence. The clear cold oil retains sufficient to act as an efficient rubefacient but not as an epispastic. One part of cantharidin requires 70 parts of oil of turpentine to dissolve it at the boiling temperature, the greater part separating, as the solution cools, in long asbestos-like needles. A piece of paper saturated with the cold solution and applied to the skin under adhesive plaster did not vesicate. Acetone (from the distillation of acetate of lime)

dissolves cantharidin with great readiness, and ranks next to chloroform in this regard. The solution deposits the substance in crystals by evaporation. The commercial methylic alcohol or wood naphtha also dissolves cantharidin, but to a much less extent than acetone. When acetic acid sp. gr. 1·41 (U. S. P.) is added to cantharidin, it but slightly acts on it in the cold; heat much increases its solvent power, which is lost on cooling and the substance deposited by standing, though not immediately. One part of cantharidin was mixed with 40 parts of *crystallizable* acetic acid and agitated together during five hours, but a small percentage was dissolved; but on applying heat the crystals were dissolved quickly. On standing, nearly all of the cantharidin was slowly deposited in regular crystals. To ascertain whether, as has been asserted,* a combination was effected, and an *acetate* of cantharidin produced, an acetic solution of cantharidin was evaporated to dryness and the crystals mixed with strong sulphuric acid and heated till dissolved, while the nose was held near, without the slightest evidence of acetic odor; one-twentieth of a grain of acetate of potassa was then added, which instantly evolved the well marked smell of acetic acid. Formic acid dissolves but a trace of cantharidin cold or hot; and muriatic acid sp. gr. 1·18 hardly can be said to act on it in the cold, but when boiling a minute portion is taken up. The same is true of phosphoric acid dissolved in five parts water. Sulphuric acid sp. gr. 1·840, when heated readily dissolves pure cantharidin without being discolored, and deposits it in crystals unchanged by cooling. Hot nitric acid sp. gr. 1 38, dissolves cantharidin readily, and deposits the greater part of it on cooling in brilliant crystals, unchanged. A concentrated solution of ammonia slowly dissolves cantharidin to a small extent, and yields it up on evaporation in crystals. Solutions of potassa and of soda also dissolve this principle.

Its Volatility.—About ten grains of pure and perfectly dry cantharidin was spread on the pan of an Oertling's balance, (sensitive to 1-150th of a grain,) and the equilibrium carefully adjusted with platina weights. After exposure for a week to the action of the air, a vessel of lime being present to keep the air dry, no change in the adjustment had occurred. To further test the volatility of cantharidin, a portion of it was put at the bottom of a dry test tube,

* New York Jour. Pharm. vol. i. p. 72.

through a paper funnel so as not to soil the sides, which was then fixed so as to dip half an inch in a mercurial bath having a thermometer suspended in it. It lost nothing appreciable after being kept at 212° F. for half an hour, no sublimate being visible with a lens. At 220° F. no visible effect was produced. Kept at 250° F. for 20 minutes, a very slow sublimation commenced. At 300° F. the vaporization was but slightly increased. The heat was then raised to 360° F., when the sublimation became more decided, yet still slow. Between 402° F. and 410° F. it fused, and rapidly sublimed at a few degrees higher. Cantharidin at this temperature volatilizes with great ease and condenses in beautiful well defined crystals like salicylic acid.

The specific gravity of cantharidin is considerable, as it sinks in nitric acid sp. gr. 1·38; it is exceedingly acrid; its powder applied to the skin with a little oil, produces speedy vesication, and taken internally it is an irritant poison of the most virulent kind.

Such are some of the more prominent characters of this remarkable substance, which exhibits a permanence and want of affinity extraordinary in an animal principle. Let us now see how far experiments with cantharidin as it exists in the flies in substance, correspond with its behavior in an isolated state.

1st. Is cantharidin, as it exists in Spanish flies, volatile at common temperatures, or at the temperature usually employed in making the cerate; and if so to what extent?

a. Six hundred grains of powdered cantharides were put into a quart flask, a pint of water poured on, and macerated two hours. The flask was then adapted to a glass tubulated receiver by means of a long glass tube, the joints made tight, and the tube refrigerated throughout its length by a current of cool water, the receiver itself being surrounded by water. A sand-bath heat was then applied and the materials in the flask kept boiling during several hours, until half a pint liquid had distilled. The product in the receiver was opalescent, with white particles floating through it, and had a strong odor of Spanish flies. It was decanted into a bottle, and agitated repeatedly with half an ounce of chloroform, which dissolved the particles and removed the opalescence. The chloroform, when separated with a funnel, and evaporated spontaneously, yielded a colorless semi-crystalline residue, having a waxy consistence and a strong odor different from that of the flies. It fused at 120° Fahr., was volatile *per se*, but was

partially decomposed and condensed in drops which subsequently solidified. This substance is soluble in alcohol, ether and chloroform, is decomposed and dissolved by sulphuric acid, produces *no signs of vesication after forty-eight hours' contact with the skin* under adhesive plaster, and is most probably the same volatile principle that has been noticed by Orfila.

The long glass tube was then examined for a sublimate, by rinsing it thoroughly with chloroform, which, on evaporation, afforded more of the same substance obtained from the distilled water, and like it did not produce vesication.

This experiment shows conclusively that cantharidin *does not volatilize to an appreciable extent with water evaporating from cantharides.*

b. More water was added to the residue in the flask, again boiled for fifteen minutes and thrown on a displacing filter, and water added to the solid residue, after the decoction had ceased to pass, until the absorbed liquid was displaced. The decoction was much less odorous than the distilled water, and had a deep reddish-brown color. Half of this was agitated repeatedly with chloroform. The latter decanted and evaporated yielded a crop of crystals intermixed with some coloring matter. A part of these heated in a tube over a lamp, gave immediately the brilliant crystalline sublimate of cantharidin well marked; another portion applied to the skin produced vesication in a few hours.

The other half of the decoction was evaporated to a soft extract by direct heat. This produced speedy and deep vesication, more effectual than that of pure cantharidin, as in the extract that principle was in a soluble state by virtue of the yellow matter of the flies.

c. The residual flies were then dried carefully and exhausted with ether, which assumed a deep green color. A green semifluid fatty oil was obtained by evaporation, from which a fluid yellow oil separated by standing, which produced a tardy vesication, not comparable with the aqueous extract.

d. One hundred grains of flies in powder were introduced into a test tube so as not to soil the sides. This was then kept at the temperature of 212° F. during six hours, by causing it to dip into a vessel of boiling water through a tin plate. The hygrometric water was removed as it condensed above. At the

end of the experiment a minute deposit of microscopic crystals less than one thirtieth of a grain, was observed above the flies on the sides of the tube.

e. Two hundred grains of flies were introduced into a two ounce retort, which they half filled, adapted to a two ounce receiver, and this again connected with a third vessel. The retort heated by a mercurial bath, was kept at 225° F., for two hours, without any product except a little odorous hygrometric water. The heat was then raised to 412° F., when a colorless oily matter flowed slowly into the receiver, mixed with water, whilst a crystalline matter mixed with oil collected in the neck. This crystalline matter mixed with the oil produced vesication when applied to the skin. The heat was now rapidly increased so as to produce brown vapors, from which was condensed a dark colored empyreumatic oil, abundant crystals of an ammoniacal salt collected in the tubes and on the sides of the receiver, whilst the aqueous liquor in the receiver was strongly ammoniacal. Neither the dark oil nor the crystals produced vesication, the high temperature having probably decomposed the cantharidin.

From these experiments it must be admitted that cantharidin is less volatile than has been asserted. The effect produced on the eye of the pupil of Robiquet who was watching the crystallization of cantharidin during the evaporation of an ethereal solution, may be accounted for by the mechanical action of the dense ethereal vapor escaping near his eye, as he watched the process with a lens, carrying off some particles of cantharidin; and the readiness with which this principle may be brought mechanically in contact with the skin of the face, during a series of experiments, by want of care, will easily account for the occasional testimony of writers in favor of its volatility at low temperatures based on that kind of evidence. During the whole of the experiments detailed in this paper, the author has not experienced any inconvenience to his eyes or face except in two instances, once when decomposing cantharides by destructive distillation, during which some of the vapors escaped near his person, and again where a small capsule containing aqueous extract of cantharides was accidentally exposed to high temperature over a lamp so as to partially decompose it; he suffered slight pain for a few hours in the conjunctiva of both eyes.

It must also be admitted that the heat ordinarily employed in making the blistering cerate of the United States Pharmacopœia, does not injure the preparation by volatilizing the cantharidin, and that the recommendation to digest the flies in the melted vehicle on a water bath is not only not injurious, but decidedly advantageous, as it increases, many fold, the solvent power of the fatty matter.

2d. Having ascertained the solvent powers of olive oil, oil of turpentine and acetic acid, on pure cantharidin, the following experiments were made with those menstrua, and with water, on the flies in substance:

a. One hundred grains of powdered cantharides were mixed with two hundred grains of olive oil in a large test tube, which was corked, and the mixture heated in a boiling water bath during four hours, with occasional agitation. The contents of the tube were then poured into a small glass displacement apparatus, surrounded with water kept hot by a lamp, and the saturated oil gradually displaced, without cooling, by the addition of fresh portions of oil. The oily liquid thus obtained had a deep green color, smelled strongly of the flies, and when applied to the skin produced full vesication in about twelve hours contact. After standing twenty-four hours shining needles of cantharidin gradually separated, but not in quantity.

b. One hundred grains of powdered flies were mixed with two hundred grains of pure oil of turpentine in a closed tube, heated in a boiling water bath four hours, and displaced while hot as in the preceding experiment. The terebinthinate solution had a dull yellow color, and was perfectly transparent as it passed, but in a short time numerous minute stellated crystals commenced forming, which increased in quantity by standing. The saturated cold solution, separated from the crystals after standing twenty-four hours, did not blister when applied to the skin.

c. One hundred grains of powdered flies were digested in a close vessel, at the temperature of boiling water, in three hundred grains of acetic acid sp. gr. 1.041, for six hours, and then subjected to displacement in the hot filter above noticed. A dark reddish-brown transparent liquid passed, which had very little odor of flies, even when a portion was exposed until the acetic acid had nearly all evaporated. A portion of this liquid applied to the skin produced complete vesication in about ten hours. After standing a few

hours, numerous minute granular crystals were deposited, which gradually increased in amount and size.

These three experiments prove that hot fatty matter is a good solvent for cantharidin as it exists in the flies, and that it retains more on cooling than either turpentine or acetic acid. That hot oil of turpentine is a good solvent for extracting cantharidin, although it does not retain much on cooling, and that officinal acetic acid at the temperature of 212° F. will remove cantharidin readily from Spanish flies, but retains but a part on cooling.

d. Five hundred grains of recently powdered flies, contained in a flask, were boiled in a pint of water, for an hour, and the clear decoction decanted, the residue again treated with half a pint of water, so as to remove all matter soluble in that liquid. The decoctions were mixed, filtered, and evaporated carefully to dryness. The extract was exhausted by repeated treatment with boiling alcohol, which left a dark colored pulpy matter, very soluble in water, from which it is precipitated by subacetate of lead. The alcoholic solution was now evaporated to a syrup, and on cooling yielded a yellow extract like mass, interspersed with numerous minute four-sided prisms. By washing a portion with water, the yellow matter was removed, leaving the crystals white and pure. The aqueous washings yielded by evaporation a residue of crystals, and does not vesicate. When the alcoholic extract was treated with chloroform the crystals were dissolved, and the yellow matter left. On evaporating the chloroform solution the crystals were re-obtained with all the characters of cantharidin. The matter left by chloroform was now treated with water, in which it dissolved, except a trace of dark substance, and was again evaporated carefully. It afforded a yellow honey-like residue, thickly interspersed with crystals and strongly acid to litmus, without vesicating power.

A portion of the yellow matter separated from the alcoholic extract by water was boiled with some cantharidin, filtered and evaporated. The residue treated with chloroform afforded no cantharidin; hence it would appear that although the yellow matter enables the cantharidin to dissolve in water and cold alcohol, when once separated its solvent power ceases.

Having now studied the effects of the ordinary solvents on cantharidin in a free state, and in the condition in which it exists

in the insect, we are prepared to consider with some clearness, the pharmaceutical preparations of the Spanish fly, and their action as vesicants.

a. If 1-30th of a grain of pure cantharidin, in fine powder, be placed on the skin of the arm and covered with a piece of warmed adhesive plaster, active vesication occurs in eight hours, with pain. If the same quantity of cantharidin be put on the other arm, a small piece of paper be laid over it, and then a piece of adhesive plaster with a circular hole in it be applied, so as to hold on the paper, no vesication occurs in sixteen hours, the powder remaining dry. If then a large piece of plaster be put over the whole, at the end of eight hours more no blistering action will have taken place. If now a trace of olive oil be applied to the back of the paper covering the cantharidin, and the plaster replaced, speedy vesication will occur. These experiments prove that cantharidin must be in solution to have its vesicating action, and that oily matter is a proper medium.

b. When powdered flies are stirred into the ordinary vehicle of resin, wax, and lard, so as to chill it almost immediately as was formerly directed, but little of the cantharidin is dissolved by the fatty matter, and when applied to the skin the process of vesication is retarded. If, however, the cerate be kept fluid for a length of time, say for half an hour, by a water-bath or other regular heat, no loss of cantharidin occurs by the heat, the active principle is in great measure dissolved by the fat, and every part is impregnated and active. In the foregoing experiments it has been shown that twenty parts of olive oil will dissolve one of cantharidin when hot. If we admit with Thierry that cantharides contain but four thousandths of their weight of cantharidin, the quantity contained in a pound of cerate is about *eight* grains, whilst the lard in the same weight of cerate is 1600 grains, or two hundred times the weight of that principle, not to speak of the influence of the wax and resin, which, in union with the melted lard, act as solvents. Hence the whole of the cantharidin may be dissolved by the vehicle. Another advantage of employing a continued heat in digestion is the removal of the hygrometric water from the flies, which is the source of the mouldiness to which the cerate is prone in certain conditions.

In a former essay (Amer. Journ. Pharm., vol. xiii, p. 302,) I have

advocated digestion in making this cerate, (a recommendation also made by Mr. Donovan, of Dublin, about the same time,) and also the use of a portion of the oil of turpentine to facilitate the solution of the cantharidin, but the foregoing experiments prove that fatty matter is quite as good, if not a better solvent alone than with turpentine.

c. It has been asserted long ago by Beaupoil, Robiquet and others, that water will perfectly extract the active matter from Spanish flies, which these experiments corroborate. Hence it is easy to understand how the condensed perspiration may facilitate the action of a blister, especially when, as was formerly much the case, its surface is coated with the dust of the flies, and the skin moistened.

It is also clear why the Unguentum Cantharidis of the U.S. Pharmacopœia is active although made with a decoction of flies, yet, in this preparation, care should be observed not to evaporate all the water, as on the existence of the aqueous extract in a soft state depends much of the efficiency of the preparation as an irritant dressing.

d. In the Linimentum Cantharidis, U. S. Pharm., in which an ounce of flies is digested in eight fluid ounces of oil of turpentine, the cantharidin is to the menstruum as 1 to 1500, a proportion probably quite sufficient to retain it in solution. The importance of the officinal direction to digest is evident. It is quite doubtful whether this liniment, as made by the process of Dr. Jos. Hartshorne, one part of flies to three parts of oil, will retain all the cantharidin after standing awhile.

e. The Acetum Cantharidis, (Lond. Ph.) made by macerating an ounce of flies in ten fluid ounces of acetic acid, 1.48, has been criticised by Mr. Redwood, (Pharm. Journal, Oct. 1841,) who arrived at the conclusion that it owed its vesicating power almost solely to the acid, he not being able to discover cantharidin in it. The inefficiency of *cold* acetic acid as a solvent for *pure* cantharidin has been proven by the above experiments, and its efficiency when hot equally shown. There can be little doubt that the London preparation would be much improved by *digesting* the flies in the acid for an hour in a close glass vessel at the temperature of boiling water.

f. The *cantharidal collodion* of M. Ilisch has been considerably

used as a vesicant in this country. Ether being a good solvent for cantharidin readily keeps that principle in solution. When applied to the skin, the escape of the ether leaves a coating of ethereal extract of cantharides, admixed with collodion. This preparation sometimes fails from a deficiency of cantharidin, at other times from want of a sufficient body in the collodion excipient, and it has been found more advantageous to treat the cantharides with ether till exhausted, distill off the ether, and add the oily residue to collodion of the proper consistence. The addition of a little olive oil, and of Venice turpentine, as recommended by Mr. Rand, will give more activity to the preparation, especially if a piece of oiled silk or adhesive plaster be applied over the part.

g. Besides these, many other epispastic preparations are made in France and other countries. The acetic alcoholic extract of cantharides of Ferrari is made by digesting four parts of cantharides in sixteen parts of alcohol 36° B. mixed with one part of acetic acid 10° B. In the opinion of the author, the acetic acid tends to prevent the crystallization of the cantharidin, a statement rendered doubtful by the above experiments, as that principle separates in crystals from an acetic solution of cantharides. The alcohol dissolves the green oil which gives to the extract a butyraceous consistence. This is undoubtedly an efficient preparation, and is used by spreading it on paper with a brush, and applying to the skin. Nearly all the French preparations direct digestion of from 2 to 6 hours, showing evidently that the experience of pharmaceutists is opposed to the opinion that cantharides is "a very volatile substance, even at common temperatures."

The vesicating tafeta of the Codex, is that proposed by Messrs. Henry & Guibourt, and is made by fusing together one part of the ethereal extract of cantharides and two of wax, and spreading it on waxed paper or linen in the manner of adhesive plaster. This preparation is said to lose its efficiency by exposure to the air. How can this occur in view of the results which have been detailed above? admitting the fact, is it not probable that the change lies in the strong tendency of the cantharidin to separate in crystals? a change easily observable in the ethereal extract. This is the chief objection to some otherwise excellent preparations of cantharides for vesication, and it is far more probably the true explanation, than that volatility should be the cause.

The recently prepared and soft aqueous extract of cantharides has been shown to be a powerful epispastic. Will this extract of the consistence of honey, associated with sufficient acetic acid, alcohol, or acetone, to preserve it, keep without the gradual separation of the cantharidin ? If so, it will undoubtedly prove one of the very best blistering agents, as by simply applying a covering of it over the surface of waxed paper, or adhesive plaster, with a camel's-hair brush, a perfect blistering plaster can be made quickly and neatly, and all tendency to change of aggregation by the action of the air on the menstruum avoided. This is a question now under trial, and should it result favorably, a formula will be published. The extraordinary tendency of cantharidin to crystallize, even under the most adverse circumstances, taken in connection with its insolubility, *per se*, has hardly received sufficient attention from pharmaceutists as a cause of the deterioration of cantharidal preparations, and the discovery of a menstruum, that will retain that principle in solution for an indefinite period, is a problem yet to be solved, and worthy the attention of pharmaceutical investigators.

Philadelphia, Sept, 1852.

OBSERVATIONS ON CERTAIN COMPOUNDS OF IODINE WITH QUINIA AND CINCHONIA, AND ON SEVERAL PREPARATIONS FROM PODOPHYLLUM, SANGUINARIA, AND CONIUM.

By W. Manlius Smith, M. D.

A portion of my medical studies were conducted under the private instruction of Dr. William Tully, of New Haven, (now of Springfield, Mass.) That gentleman was in the habit of prescribing in scrofulous diseases a preparation he called *protiodide of quinium*, the termination *um* being in analogy with ammoni*um*, on the supposition that the reaction occurring is similar to that where ammonia is presumed to become ammonium by combination. His formula was simply this:—To a known quantity, say one equivalent of disulphate of quinia, dissolved in the smallest possible quantity of boiling distilled water, a quantity equal to two equivalents of iodide of potassium was added. Sometimes, though

not always, a slight yellow tint was produced in the liquid. On cooling beautiful stellated groups of crystals were formed, bearing a resemblance to the disulphate of quinia. Occasionally but few crystals were formed, but in place of them an amorphous resin-like substance adhered to the sides of the vessel. It was considered preferable to obtain the iodide in the latter form, as it could be made into pills without an excipient. The pills after being made a short time become firm and hard.

In reflecting on Dr. Tully's formula, it occurred to me that a sub-iodide of quinium, or perhaps an oxy-iodide, was formed while an equivalent of iodide of potassium was in excess, as the mother-liquid contains much of the latter salt as indicated by corrosive sublimate. It then appeared to me that in order to form the protiodide the neutral sulphate of quinia should be used. I then added half an equivalent of sulphuric acid to one equivalent of disulphate of quinia in sufficient water, and afterwards one equivalent of iodide of potassium, when a transparent yellow liquid resulted, which on standing a short time assumed a gelatinous consistence. By pressure the greater part of the liquid was separated, leaving a light yellow mass that was easily pulverizable when dry, but not crystallized. The expressed liquid again became gelatinous from the separation of more of the salt.

I afterwards formed a double iodide of quinium and potassium, by adding to the solution of neutral sulphate of quinia as much iodide of potassium as was equal to two equivalents; a yellow precipitate occurred, which became crystalline on standing, and assumed the form of small feathery prismatic crystals. This salt probably contains water of crystallization, as the product obtained is greater than on theory it should be, if anhydrous.

By similar and parallel processes, *protiodide of cinchonium* and *double iodide of cinchonium and potassium* were made. I formed what I suppose are the deutiodides of cinchonium and quinium, by precipitating the potassium from the double iodide of these bases and potassium, by means of an alcoholic solution of tartaric acid, in the form of bitartrate of potassa. The solution after being filtered was evaporated spontaneously. The salt of quinia is in the form of a deep brown amorphous mass: that of cinchonia in fan-shaped clusters of crystals.

A solution of iodide of cinchonium and potassium in alcohol, is

decomposed by spontaneous evaporation, as iodide of potassium in cubical crystals separates to some extent.

I have formed in a manner analagous to that used in making the preceding compounds, salts in which bromine replaced the iodine, with quinia and cinchonia. They are all white or brownish-white preparations, more soluble in water than the iodides, and forming larger crystals. I have succeeded in making several compounds in which iodide of sodium replaced iodide of potassium.

The term *podophylline* is applied to the resin of podophyllum pellatum by the so-called "eclectic practitioners." As prepared by them, the alcoholic tincture of the root is distilled to remove the alcohol, and the resin which separates as the alcohol distils off is removed from the watery liquid, dried and powdered. I consider a better mode is to concentrate the tincture till most of the alcohol is evaporated, and throw the residue into water when the resin precipitates. The consistence of the resinous liquid before precipitation by water is important, because if too concentrated the resin separates in clots, and is not easily washed. In its purest state this resin is colorless. See the Inaugural Essay of Mr. John R. Lewis, Amer. Jour. Pharm., Vol. xix. page 165.

This resin of podophyllum will purge a susceptible person quite thoroughly five or six times, the last evacuations being very watery and copious. Two grains will purge actively persons of ordinary susceptibility, and three grains will generally suffice for almost any one. Some persons experience nausea and even vomit, though I do not know that they are more affected by this article than by any other active cathartic. The eclectics also prepare *Macroytin* from the root of Cimicifuga racemosa, *Leptandrin* from Leptandra virginica, and *Sanguinarin* from Sanguinaria canadensis. The latter substance is to be distinguished from the *Sanguinarina* of Dana, which is an alkaloid. I have prepared some of the sulphate of sanguinarina by the process given in Silliman's Journal, 1831, Vol. 2d, page 503 and 504. Dr. William Taylor, of this neighborhood, has used this sulphate as an expectorant in lung diseases, and has been very favorably impressed by its action. He used it in doses of about one-fourth of a grain.

I have also prepared the "preserved juice" of Conium maculatum, (see U. S. Disp., 6th edit., p. 1159,) by adding one part of alcohol to two parts of the recent juice and filtering. It appears

to possess the narcotic properties of conium in perfection; most subjects will be inconveniently effected with half a fluid drachm; some, however, will tolerate one fluid drachm or even more.

[Note by the Editor.—The preceding observations by Dr. Smith, constitute the substance of a letter to Dr. Wood, of the University of Pennsylvania, which was placed in our hands with permission to make such use of it as we thought best. We would remark, in reference to the first substance described by Dr. Smith, that the same compound was prepared, analysed, and described by Messrs. Lewis and Husband, in the 16th volume, page 21, of this Journal, April, 1844. These gentlemen consider it a dihydriodate of quinia, and state that the additional equivalent of iodide of potassium is necessary to the reaction. They tried to make a monohydriodate with neutral sulphate but did not succeed, as they obtained the di-salt with free sulphuric acid.

Liebig (Chimie Organique, tome ii. p. 580,) refers to two salts of hydriodic acid and quinia; a basic salt, and a neutral one, but does not describe the mode of preparation.

In reference to Dr. Smith's nomenclature for the compound he describes, he is hardly justified in carrying out the analogy to the vegetable alkaloids. Ammonium is but partially conceded, notwithstanding its amalgum with mercury. It would have been more satisfactory to have had fair proximate analyses of these compounds before naming them. The reader is referred to Vol. xxiii. page 329 of this journal for some fuller information on the preparation of the eclectic remedies alluded to by Dr. Smith.]

ON GELSEMINUM SEMPERVIRENS OR YELLOW JASSAMIN.

By William Procter, Jr.

Considerable attention has recently been turned to the Yellow Jassamin of our Southern States, from the accidental discovery of certain remarkable effects produced by it when taken internally. A planter of Mississippi having suffered much from a tedious attack of bilious fever, which resisted the usual medicines employed in such cases, requested one of his servants to obtain from the garden a certain root, from which he intended to prepare an infusion for drinking. By mistake, the person sent collected a different root, and administered the tea to his master, who, soon after taking it, was seized with a complete

loss of muscular power, being, in fact, so completely prostrated as to be unable to move a limb or to raise the eye-lids, yet he could hear and could appreciate what was occurring around him. After some hours, during which his friends were watching him with much anxiety and little hope, he gradually recovered his muscular control, and was astonished to find that the fever had left him. Having ascertained from his servant what plant he had collected, he subsequently employed it successfully on his own plantation as well as among his neighbors. The history becoming known to a quackish physician, he prepared from it a nostrum called the "Electrical Febrifuge," in which it was disguised by oil of winter-green, (*Eclectic* Dispensatory, page 186.)

The Gelseminum is not noticed by Dr. Griffith in his Medical Botany, nor in the recent edition of the United States Dispensatory, and so far appears to have been used chiefly by the "Eclectic" practitioners of Cincinnati and other parts of the Western States. The accompanying description of the plant is taken partly from a specimen sent from Memphis, Tennessee, where, in common with other parts of the south-western States, it is cultivated as an ornamental garden plant.

The Gelseminum belongs to the natural order Apocyneæ, so remarkable for the great activity of many of its genera, and the name of the genus, given by Jussieu, is one of the ancient names of the jassamine, and that of the species arises from its evergreen foliage.

GELSEMINUM belongs to Pentandria Digynia of Linnæus, and to the natural order Apocyneæ of Jussieu.

Generic characters.—Regular, calyx five parted, (the sepals of this species being furnished with bract-like appendages) carolla funnel-form, border spreading, five lobed, nearly equal, capsule compressed, flat, two partible, two-celled, seeds flat and attached to the margins of the valves, (Eaton.)

Specific characters.—The G. sempervirens is known at the South under the names *yellow jasmine*, *wild jasmine* and *woodbine*. In Florida it flowers in March, and in Mississippi and Tennessee in May and June. Its stem is twining, smooth and glabrous; its leaves are opposite, perennial, lanceolate, entire, dark green above, paler beneath; with short petioles.

The flowers, which are esteemed poisonous, are yellow, about an inch long and half an inch wide at the top, of a fine yellow color, and have an agreeable odor, which perfumes the air when they bloom. It grows luxuriantly, climbing from tree to tree, forming a delightful shade. According to Eaton, from whose botany we glean part of the above botanical notice, there is a variety called *inodorum* which has scentless flowers.

The Gelseminum is indigenous to the Southern States, and its beauty has caused its introduction into the gardens.

Medical properties and uses.—The root is the part used, and the tincture is the preparation most usually employed, and, as made, must be a saturated tincture. The roots, in a green state, well bruised, are introduced into a suitable vessel, and covered with *whiskey* or diluted alcohol. After standing two weeks, the tincture is separated by expression and filtered. It has a dark red color, and a pleasant bitter taste. The dose is from ten to fifty drops. The following account of its medical properties and affects is taken from a paper in the "Eclectic Medical Journal," August 1852, page 353, by F. D. Hill of Cincinnati:

"Gelseminum is stimulant, tonic, and anti-spasmodic: By its relaxing effect it produces gentle diaphoresis, and is said to be *narcotic*. Its effect in large doses, or doses too frequently repeated, is extreme relaxation, and general prostration of the whole muscular and nervous system. It will suspend and hold in check muscular irritability and nervous excitement with more force and power than any known remedy. It is of a pleasant bitter taste, and performs its wonder-working cures, in all febrile diseases, without exciting either nausea, vomiting, or purging. When enough has been given to produce its specific effect, the eye is dimmed, the vision clouded and double, the head light and dizzy. When these effects follow the administration of this remedy, no more should be given until the patient has entirely recovered from its influence. 'It may be used in all species of fevers, nervous and bilious headache, colds, pneumonia, hemorrhages, leucorrhea, chorea, ague-cake, asthma, and many other diseases: but its efficacy has been most admired in all forms and grades of fevers.' It should always be used with great care and caution. The root is said to possess a resinous principle, which, when extracted by pure alcohol, will produce death in very small doses. But no such effect need be expected from the proper dose of the common tincture. There is danger of carrying it to such an extent as to suspend involuntary muscular action,

and when this is the case, death must ensue. 'It is incompatible with no known substance, and may follow any *preceding treatment with perfect safety.*' The dose is forty drops for an adult, and children in proportion to age and temperament. It is given either with or without quinine. It has been used alone for *chronic rheumatism*, in doses of forty drops, three times a day, with marked effects. Three or four doses, with a mild cathartic, will remove the redness and swelling attending inflamed sore eyes. Special attention should be directed to the general health and constitution of the patient before giving gelseminum. If the bowels be constipated they should be moved by a gentle aperient, and kept in a relaxed condition. It requires double the quantity to produce the effect on some that it does on others; and should the practitioner ever produce too great a degree of relaxation, he should lose no time in stimulating and toning up his patient."

The alleged effects of this plant on the human system, taken in connection with its medico-botanical relations, mark it out as being probably one of the most valuable of our indigenous remedial agents, and render it well worthy of the investigation of regular physicians.

ON THE GRADUATING OF HYDROMETERS.

By W. H. Pile, M.D.

Having been requested to graduate some hydrometers as standards, in which the degrees of Beaumé's scale should correspond to the specific gravities as proposed by Mr. H. Pemberton (see Amer. Jour Phar. Jan. 1852) and sanctioned by the Philadelphia College of Pharmacy, I prepared for that purpose, by means of the Sp. Gravity bottle, a series of liquids of densities corresponding to every ten degrees of Beaumé's scale. Subsequently, however, upon reading over an article on hydrometers (Booth's Cyc. of Chemistry,) and making a few experimental trials, I have ascertained that hydrometers can be graduated to any degree of accuracy required, without the necessity of using the Specific Gravity bottle, and involving the use of pure water only. Believing that this method will prove serviceable to any one wishing to engage in the manufacture of hydrometers, I offer the following plain and practical

directions, by which a careful workman will be enabled to graduate his instruments without being obliged to resort to standards, the accuracy of which he has no means of determining.

1st. For liquids lighter than water.

According to the well-known hydrostatic law, "A floating body always displaces its own weight of the liquid in which it swims," the weight of any liquid which the hydrometer displaces is, therefore, equal to the weight of the hydrometer. From this fact the following proportion is deduced: As the weight of the liquid on trial is to that of water or unity, so is the original weight of the hydrometer to its required weight. The sp. grav. corresponding to 20° B. Pèse esprit, being ·93333, we have, as ·93333 : 1 :: weight of hyd. : required weight of hyd. $=\left(\frac{1 \times \text{wt. of hyd.}}{\cdot 93,333}\right) =$ weight of hyd. × 1·071428, and by subtracting the original weight of hyd. from this amount, there remains weight of hyd. × ·071428 (.071 nearly) as the weight required to be added to sink the hydrometer to 20° B., and the same amount for every other ten degrees successively. This is conveniently done, and the instrument graduated in the following manner: Having fastened in the stem of the hydrometer a slip of paper of the exact weight of the intended scale, and divided accurately for its whole length, into spaces as small as possible and numbered, immerse it in pure water at the temperature of 60° Fahr.; then add mercury or fine shot until the instrument sinks to the place intended for the commencement of the scale. Next dry the hydrometer carefully, and weigh it. Then immerse it again in the water and observe the division on the scale where the surface of the water cuts the stem —this will be the zero point or 10° Beaumé. For each succeeding 10° Beaumé drop into the hydrometer a quantity of mercury, found by multiplying the original weight of the hydrometer by ·071, as above shown, and reading off the divisions to which the stem sinks successively. If the stem was perfectly cylindrical, the 70° Beaumé could be ascertained at once by adding the requisite weight (wt. of hyd. × .071 × 6) and the intermediate space divided equally into 60 parts. The hydrometer is, lastly, to be emptied and its original weight made up; the true scale is then to be finished by withdrawing the graduated slip and marking off the observed numbers for every ten degrees; the intermediate degrees are then divided off, the scale fastened in its correct place and the stem hermetically sealed.

2d. For liquids heavier than water.

The specific gravity corresponding to 10° B., Pèse acid being 1.07407 + we have the following: as 1.07407 : 1 :: wt. of hyd., required wt. of hyd. = wt. of hyd. × ·9310346 +, and by subtracting this from the original wt., there remains wt. of hyd. × ·0689654* +, or ·069 nearly, for the amount to be withdrawn, to enable the stem of the hydrometer to rise to the 10th degree of Beaumé. The hydrometer in this case must be made to sink to near the top of of the stem, which of course will be the zero point or 0° Beaumé; then by successively taking out the proper quantity of mercury, as shown above, (wt. of hyd. × ·069) the divisions, corresponding to each 10° B., are noted down as the stem rises. In practice it will be found much more convenient to get the 70° B. first by taking out seven times the above quantity, and then by restoring successively the seventh part of the amount taken out, to mark the divisions as the stem sinks. The scale is then to be finished as usual.

Hydrometers can be graduated in a similar manner, for showing directly the specific gravity of any liquid, by using the following formula: Weight of the hydrometer when sunk to the proper depth, divided by the specific gravity required, the quotient will give the required weight of the hydrometer; if this is less than its actual weight, the difference is to be withdrawn; if greater, the difference is to be added. It will be necessary, as the degrees will vary unequally, to determine the divisions of the scale for every 5, 10 or 20 grs. (water reckoned 1000) according to the accuracy required.

It will be evident that alcoholometers and others of a similar character, can readily be graduated by the same formula, marking off the specific gravities corresponding to each per cent. of alcohol. As the percentage by volume and percentage by weight varies considerably, it should always be stated on the scale which of the two the instrument is intended to indicate.

PHILADELPHIA, N. E. corner Passyunk road and Catharine street.

* The ratios which the excess or deficiency bears to the original weight of the hydrometer gives the modulus of the scale as recommended by Mr. Pemberton: thus for the Pèse acid $1 \div \cdot 0689654 + = 145$, and for the Pèse esprit $1 \div 0{\cdot}714285 + = 140$.

ON SYRUP OF ASSAFETIDA.

By Richard Peltz.

(*From an Inaugural Essay.*)

Assafetida has long held a high rank as an antispasmodic and expectorant, but has not been used as extensively as its virtues seem to demand, both on account of its very unpleasant odor and acrid bitter taste. It consists chiefly of resin, gum and volatile oil.

The Pharmacopœia of the United States recognises as officinal two fluid preparations of assafetida—the tincture and the mixture. These, although very good preparations, are both objectionable on account of their unpleasant taste. This, I think, could be remedied in part by making a syrup; with which purpose I have undertaken a number of experiments, to ascertain if a preparation could not be made which would contain in a more agreeable form all the medicinal properties of assafetida soluble in water.

Having tried a number of methods I concluded that the following formula would make the most perfect preparation:

Take of	Assafetida	an ounce,
	Boiling water	a pint,
	Sugar	two pounds.

Triturate the Assafetida in a mortar with a portion of the boiling water until an uniform paste is formed, then gradually add the remainder of the water, strain and add the sugar, applying a gentle heat to dissolve it.

Much heat should be avoided in forming the syrup, as the volatile oil, which is present in considerable proportion in good assafetida, (nearly 6 per cent.) a portion of which is dissolved or held in suspension by the water, would be dissipated.

There is an advantage in using boiling water, as it takes up more of the gum-resin, which is permanently dissolved or held in suspension by the sugar.

This syrup, when first made, is nearly white, but upon exposure to light gradually assumes a pinkish tinge. It is of the same strength as Mixture of Assafetida of the Pharmacopœia, and owing to its being more pleasant to the taste, might with

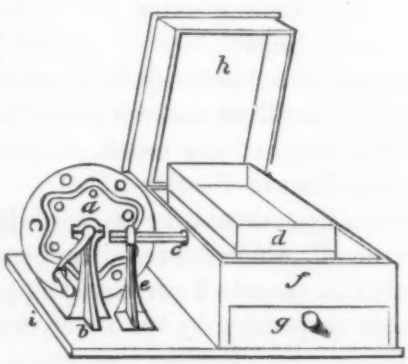
advantage be given as a substitute for that preparation, especially in cases of children, as the sugar conceals much of the unpleasant acrid taste of the assafetida.

This syrup is much more permanent than the mixture, having kept some for several months without any apparent change, except in color, owing to the action of the light on the resin; while the mixture kept in the same situation became very unpleasant in a short time. It also has an advantage over the tincture in being entirely free from alcohol, which sometimes is objectionable.

PHARMACEUTICAL APPARATUS.

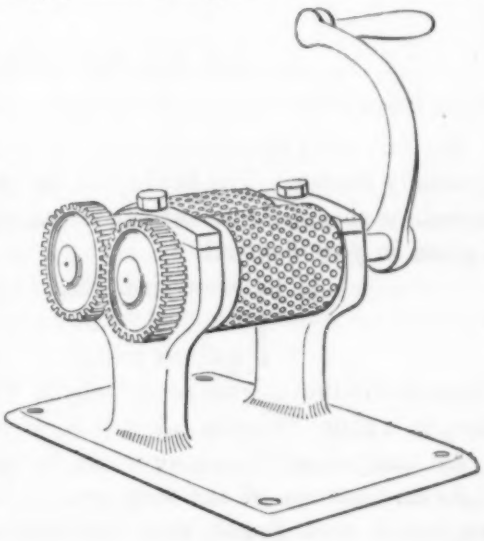
By the Editor.

Swift's Patent Seive.—On a former occasion, (vol. xviii. 255,) we described a mill intended for the apothecary's use, laboriously and disagreeably effected in the mortar, might be accomplished with comparative facility and comfort. We have now to notice a sifting apparatus by the same inventor, (see figure,) intended as an adjunct to his mill, but which will be found useful on many occasions when the mill is not needed. It consists of an iron wheel, axle, and crank, *a* having an eccentric groove sunk into one of its sides so as to present six wave like depressions and elevations. The wheel is firmly supported by the cast-iron standard *b*, on a stout wooden base *i;* another iron standard *e* supports in a smooth groove, and against the wheel, the end of the horizontal iron bar *c*, from which an iron pin projects into the groove of the wheel. The other end of the bar passes through the side of the box *f*, and is pinned to the square seive *d*, which works smoothly in a hori-



zontal direction on ledges within the box; *g* is a drawer beneath to catch the powder as it passes, and *h* a tightly fitting cover, which prevents the escape of dust without impeding the motion of the sieve. It will be at once perceived, that on turning the crank, the horizontal bar will be forced back and forth by the zig zag direction of the groove, which motion it communicates to the sieve; each revolution of the crank causing six distinct jerks of the sieve. There are seives of two or three sizes, so as to yield powder of different degrees of fineness.

Rotary Pill Machine.—This apparatus is intended as an expeditious means of making quantities of pills. It consists essentially of a pair of rollers of equal diameter moved towards each other, above, by accurately made cogs attached to the end of each by means of a crank attached to the axel of one of them. The surface of each roller is penetrated at regular distances with hemispherical cavities, arranged with mathematical precision, in such a manner that when the rollers press together, each successive row of cavities meets the corresponding one on the other roller, so that at the point of contact a row of spherical moulds is produced. The rollers are supported firmly on a cast-iron base and supports. The rollers are approximated, when required, by lateral screws passing through the sides of the supports not seen in the figure. In using this machine the pill mass should have a uniform consistence of a certain firmness, not too tough or adhesive. It should be formed into ribbon-like strips, about one-eighth of an inch in thickness, and while one person turns the crank, which requires a considerable degree of force, another feeds the rollers as they gradually draw in the



mass, and clear the moulds of such pills as adhere. We are informed by Charles Ellis & Co., who are the agents for both of these machines, that the patentees are about to modify the rollers so as to make pills of three sizes. The chief difficulty in using the machine appears to be in getting the mass of such a consistence that the pills can be easily disengaged from the matrices, which are slightly greased. The necessity of using oil will be an objection to its use in some cases, but perhaps soap or some other substance will answer; our experience with the apparatus is too brief to venture an opinion.

INK FOR THE MILLION.

To the Editor of the American Journal of Pharmacy:

The following formula for making a *very superior* ink is not generally known. The facility of its preparation and its almost incredible cheapness (about two cents a gallon,) render it worthy a place in your Journal.

℞ 12 oz. avoird. Ext. Logwood
½ oz. " " Bichromate Potash
5 gallons water;

Dissolve the ingredients separately in water and mix them together, in a short time the ink will be fit for use.

An analysis of the above would be very desirable.

As an instance of the very great coloring property of hæmatoxylon, I have found that 1-100th of a grain dissolved in 4,000,000 times that quantity of water, will be tinged a fine pink color by the addition of a little aqua ammonia.

Yours truly,

W. H. PILE.

Philadelphia, Sept. 13, 1852.

Note by the Editor. As Dr. Pile's formula appears to be based on that of Professor Runge, noticed on a former occasion, we will annex some observations on Runge's ink, taken from the *Pharmaceutical Journal*, Aug. 1852, page 71:

"*Professor Runge's Writing Fluid.*—One of the least expensive formulas for the manufacture of a writing ink, is that given by Professor Runge,

who says: 'I have for some time endeavored to find a black fluid possessing the properties of forming no deposit, of adhering strongly to the paper, of being unaffected by acids, and lastly, what is of great importance, not acted upon by steel pens.

'After many experiments, I have succeeded in obtaining a composition of the kind required, very simple in its preparation, containing nothing but logwood, chromate of potash and water, and free from vinegar, gum, copperas, blue vitriol, and even nutgalls. The low price of this writing fluid is also in its favor. It is prepared by simply adding one part of chromate of potash to 1000 parts of decoction of logwood, made by boiling twenty-two pounds of logwood in a sufficient quantity of water to give fourteen gallons of decoction; to this decoction, when cold, the chrome salt is gradually added, and the mixture well stirred. The addition of gum is injurious. In the preparation of this ink, it must be remembered that the yellow chromate and not the bi-chromate of potash is employed, and great care is required to ensure the due adjustment of the relative proportions of the ingredients used. The best way is to make a decoction of logwood, and *gradually* add to it, well stirring the mixture, as much solution of chromate as will give the shade required.

'It appears astonishing what a small quantity of the chrome salt is required to convert a large quantity of decoction of logwood into a black writing fluid; the fact is, however, certain, and care must be taken not to allow the proportion of chrome salt to exceed half a part for each 500 parts of decoction of logwood, as a larger quantity exercises a prejudicial effect in destroying the coloring matter of the liquid, whilst in the proportion above mentioned, a deep blue black writing ink is formed, which, unlike the ink made with tannogallate of iron, is perfectly fluid, forming no deposit. This writing fluid possesses another advantage; the paper which has been written upon with it may be washed with a sponge, or be left twenty-four hours under water, without the writing being effaced. Weak acids do not destroy the writing, nor do they even change the shade, while that made with gall-nuts is effaced, and the ink prepared with logwood and copperas is turned red.

'New steel pens are coated with a greasy substance, which prevents the ready flow of the ink; this should, therefore, be removed previous to use by moistening the pens with saliva, and then washing them in water. The application of an alkaline solution is still preferable to effect the removal of this greasy matter. This cleansing of the steel pens is absolutely essential in the case of using the ink above mentioned. I have used this ink upwards of two years, and my steel pens are not in the least degree affected. No rust is formed on the pens, so that after years of service the only wear experienced is that from constant use on the paper, thus rendering unnecessary the use of pens tipped with iridium and other hard substances.'"

PHARMACEUTICAL NOTICES—CIRCULATORY DISPLACEMENT.

By Joseph Laidley, of Richmond, Virginia.

Circulatory displacement was brought to the notice of American pharmaceutists several years ago, through Mr. Alsop,* of London, as applicable in the preparation of *infusions;* subsequently Dr. Benton suggested the feasibility of applying the same principle in preparing *tinctures;*† but the process is so little resorted to by our profession, that I would again call attention to it.

It possesses no advantage over percolation, where this process *can* be employed; there are some substances, however, which cannot easily be exhausted of their soluble matters by percolation alone, it is for these that circulatory displacement is especially applicable.

Professor Procter has already pointed out the advantages it affords in dissolving salts, especially those that undergo change when submitted to the prolonged action of the atmosphere and heat, as, for instance, protosulphate of iron.‡

The gum for syrup of gum arabic may be very rapidly dissolved *without heat* in this way. It is only necessary to tie the gum in a bag made of gauze, cambric, or some similar fabric, and suspend it just below the surface of the water contained in a specie jar. On a recent occasion I arranged, on the night of Saturday, 16 oz. (Troy) of gum in half a gallon of water, and on examining it early on the following Monday morning the gum was all dissolved.

This process may be advantageously employed in dissolving sugar in preparing syrups; especially for those where a high temperature is injurious, as in some of the syrups of fruits, I have employed it very successfully. It has also the advantage of obviating the scratching of the sides and bottom of the syrup pan, so often produced by the sugar when rubbed against them by the stirrer. When preparing syrups in this way the kettle should be tall, and of small diameter—tinned iron answers well—the sugar, in grains or crushed, should be suspended at the surface of the liquid in a coarse flannel bag, secured at the top to a strong hoop.

* Am. Journ. Ph., viii. 89.

† Mohr, Redwood and Procter's Pharmacy, pp. 238 and 267.

‡ Am. Journ. Ph., xvi. 313.

It may also be employed in making tinctures of the resins and balsams, especially of the soft ones, tinctures of assafetida, tolu, compound benzoin, &c., &c., may be easily prepared in this way, using a wide mouthed bottle, and securing the bag to the cork by means of twine or wire. It is the most satisfactory method of preparing paregoric—the solids are placed in the bag and suspended in the mixed liquids contained in a bottle—for this purpose the opium should be in *coarse* powder.

To prepare laudanum, as well as many other preparations, where ordinary displacement is inconvenient or troublesome, the following plan is pursued:—say one gallon of laudanum is wanted, I take 10 oz. (Troy) of coarsely powdered opium, and having introduced half a gallon of diluted alcohol into a specie jar, suspend it just below the surface for twelve hours, it is then carefully packed in a percolator, covered with sand, and the half gallon of liquid from the jar is made to percolate through; diluted alcohol is next added until the filtered liquid measures one gallon. As thus prepared, laudanum (if good opium be used,) is of full strength; the last portions of liquid that come through have hardly any color and possess but very little taste. One gallon of laudanum may in this manner be prepared in twenty-four hours, and is more nearly perfect than that afforded by any other process with which I am acquainted.

To prepare wine of colchicum seeds, the latter are macerated for twenty-four hours in wine, they are next bruised thoroughly and treated as in making laudanum. But it is unnecessary to multiply examples, one of the above mentioned methods will be found applicable in almost, if not every case, where simple displacement cannot be conveniently employed. The advantages they offer over maceration are too obvious to require further recommendation, and I will only express the hope that pharmaceutists will more generally avail themselves of such simple and easy methods of extracting the medicinal properties of such drugs as they will answer for.

REVIEW.

DIE LEHRE VON DEN CHEMISCHEN ARZNEIMITTELN UND GIFTEN; IHRE EIGENSCHAFTEN, ERKENNUNG, PRÜFUNG UND THERAPEUTISCHE ANWENDUNG. Von Dr. ADOLF DUFLOS, Ausserordentlichem Professor der Chemie an der Universität zu Breslau, Administrator der Königlichen Universitäts Apotheke daselbst, Vice Director des nord-deutschen Apotheker-vereins, etc. Zweite Ausgabe. Mit besonderer Berücksichtigung der neusten Pharmacopoeen. Breslau.

CHEMICAL REMEDIES AND POISONS; THEIR PROPERTIES, RECOGNITION, TESTS, AND THERAPEUTIC APPLICATION. By Dr. ADOLF DUFLOS, Adjunct Professor of Chemistry in the University of Breslau, etc. Second Edition. With special reference to the latest Pharmacopœias. Breslau. 704 pp. octavo.

The rapid progress of modern chemistry may be in a great measure attributed to the arduous research, and the many discoveries of startling brilliancy which characterized the declining years of the last, and the earlier portion of the present century. More recently, rapidity of development has been quite as remarkable; and, as the science becomes more complete, it naturally becomes more diffused, and more universal in application. Consequently, we now make distinctions which in former years would have been impracticable. Thus, we have chemical works with various titles, indicative of what special branch they may expound; on theoretical and practical chemistry, for instance, on animal, and agricultural chemistry, and also on chemistry applied to most of the arts and manufactures. Although pharmaceutical chemistry has by no means lagged behind other branches, its literature, so far as the English language is concerned, is meagre, and has not flourished in a ratio corresponding with its increasing elevation and practical importance. This is particularly observable in the paucity, or rather absolute want of proper text books on the subject.

In regard to pharmacological chemistry, or that branch which considers the properties and uses of chemical remedies, if indeed, in its usual acceptation, the term does not also include the practical or pharmaceutical department, the same cannot be said, since

no small portion of all our materia medicas must necessarily be devoted to observations on chemical remedies. Leaving, for a moment, all other works out of the question, every apothecary has a complete digest of such information, and also much that is strictly pharmaceutic in its character, in what was long since the *sine qua non* of an American pharmaceutical establishment, the United States Dispensatory. There is no doubt, however, that a work which would in a certain degree comprehend both branches of the subject, and yet be sufficiently general and elementary in its details to form a text-book adapted alike to students of pharmacy and medicine, could not but be well received.

Of such a class is the volume before us. Germany, indeed, appears to be favored in this respect. Works on pharmaceutical chemistry and on chemical pharmacology abound. Dr. Duflos, our author, has published a number of books, all more or less connected with the subject. The work under consideration consists of improved editions of two previous publications, bound in one, yet retaining their distinct characteristics, being paged separately, and having different registers of contents. As now published it consists of four parts. The first part, originally issued under the title "Pharmacological Chemistry," was designed, as we are informed by its title page, "as a text book, and for the use of practical and judicial physicians and surgeons."* It contains one hundred and seventy for the most part closely printed pages, and resembles our own text books of general chemistry; the brief notices of preparations, however, and the attention to points of interest and importance to pharmaceutists and physicians, wherever such reference may be indicated, give it a technical appearance.

The first fifty pages are devoted to the fundamental principles of the science. The difference between organized and inorganized bodies is explained; then heteromorphism, isomorphism, absolute and specific weight, the combining proportions, chemical symbols, and so on, are duly considered. But little is said of light and heat, beyond noticing the light and heat capacity, and the influence of the latter on cohesion, and on the forms and properties of bodies. Electricity and magnetism are entirely omitted. With

* Practical physicians are those who have received the degree, and who have also passed through the ordinary hospital course. The judicial physician is a post somewhat similar to that of our coroner.

us, since lectures on chemistry usually embrace these subjects, a treatise on that science, be it ever so brief, cannot well omit entering in full upon them, or at least considering them in their connection with chemical phenomena. In Germany, we presume that students are left to obtain the necessary information while prosecuting the study of physics, for which, in the larger universities, a distinct professorship exists. Matters pertaining to operative chemistry, such as solution, evaporation, fusion, etc., are then briefly explained; after which follows a list of the chemical equivalents, and a valuable comparative table of the various medicinal weights in use in the various German states, and in foreign countries. The gases, and such of the other non-metallic elements as are important in a pharmacological point of view, are then considered. Here the arrangement of the author is comprehensive and peculiar, and, indeed, not without advantage, since his classification allows him to bring in, arranged in proper groups, according to their ultimate constituents, not only the inorganic compounds, but also the azotized and non-azotized organic bodies. Students are thus enabled more easily to comprehend and recollect the relationship which may exist between one group and another. The rest of this division is taken up with outlines of the metals; since the major portion are officinal, they are mostly referred to the second part.

The second part considers only chemical remedies. The acids, ethers, alkaloids, alkaline and metallic salts, together with such of the distilled waters as may involve chemical principles and changes in their preparation, are treated alphabetically and in a methodical manner. The synonyms, outlines of preparation, properties, various means of recognition, tests for impurities, and therapeutic application, are severally discussed under distinct heads; to which is added, if the substance under consideration be a poison, its antidotes and other points of toxicological importance. The Latin nomenclature adopted by our Germanic brethren differs slightly from our own. For instance, Aqua calcariæ Chinium sulfuricum; natrium-stibato-sulfuratum, or sulpho-stibias-natricus, if there be a choice. Among the synonyms of tartarus boraxatus is given tartras-borico-natrico-kalicus; these compound terms, however, belong to a bygone period. The German itself is not unfrequently quite as formidable. Take as a specimen:

Salpetresaure Quecksilberoxydutflüssigkeit—although when this is translated into every word that it expresses —solution of the nitrate of protoxide of mercury—it is really no longer than the corresponding English.

The third division is devoted to chemical analysis. It comprises reagents, analytic instruments and apparatus, general directions for testing medicinal substances, remarks concerning chemical poisons and the manner of conducting judico-chemical examinations, together with the mode of analysing milk, blood, urine and urinary calculi. Those chemical substances which from their destructive action on the living organism have been classed among the poisons, the author divides as follows: 1. The so-called mineral acids, together with some of vegetable origin (oxalic, for instance.) 2. The alkalies. 3. The caustic alkaline earths, (caustic lime, etc.) 4. Hydrocyanic acid. 5. The organic alkalies, (from opium, the strychneæ and strychnoids.) 6. Many preparations of the metals, (preparations of copper, lead, arsenic, etc.) 7. A few salts, comparatively inert in small portions, but not without risk in large quantities, (hydrochlorate of ammonia, nitrate of potassa.)

The *modus operandi* of poisons, their antidotes, and the means by which they may be detected in organic mixtures, are matters which although they may perhaps belong more especially to the province of the physician, are nevertheless of much importance to pharmaceutists. The unrestrained and too frequently indiscriminate sale of the most virulent poisons, and the numerous cases of poisoning, either by accident or design, which must necessarily follow, render us at any moment liable to be called upon for assistance at times when chemical knowledge and coolness of judgment are absolutely necessary for the relief of the unfortunate sufferer. Consequently it is incumbent upon every pharmaceutist to be prepared for such emergencies.

The fourth part, termed a Hülfs-Register, is the Index. The Latin, French and German terms used in the work are separately arranged.

We are tempted to take advantage of the opportunity to remind our junior readers of the propriety of acquiring a sufficient knowledge of the German language to make use of the many scientific works with which it teems. Independent of the pecuniary ad-

vantages which may at any time result,—independent, also, of the fact that it tends to make one to a certain extent familiar with the authors and polite literature of a great people, a circumstance which of itself should be sufficient to induce any one to devote, for a time, his leisure hours to its acquisition,—there is to the pharmaceutist the perhaps still more important consideration, that it opens to him a new field of established and current scientific literature, the variety and extent of which but little idea can be formed by the uninitiated. Time so spent will not be regretted. J. S. K.

NOTE ON THE PREPARATION OF BESTUCHEFF'S TINCTURE.

By Fr. Mayer,

Pure sesqui-chloride and proto-chloride of iron are unknown to the Pharmacopœia of the United States, a fact which seems strange to a German pharmaceutist, since they are met with in every German dispensatory, and require great care for their proper preparation.

The American Pharmacopœia indeed recognizes a tincture of of chloride iron, prepared by dissolving the sub-carbonate (sesqui-oxide) of iron in hydrochloric acid, and adding alcohol. This tincture would be rejected throughout Germany, since they endeavor there to obtain the preparations of proto-chloride of iron free from any traces of sesqui-chloride, while those of the sesqui-chloride should contain no admixture of the proto-salt. This shows the practical character of the American Pharmacopœia, which does not demand of the apothecary a purity of preparation which it is next to impossible to meet.

While making this acknowledgment, a good formula for the preparation of sesqui-chloride of iron still remains desirable. This drug, too, is sometimes used in American practice, as may be seen from the "Notes on Pharmacy," by Mr. Benjamin Canavan, in the May number of the *New York Journal of Pharmacy*. Mr. Canavan has given one of the oldest formulæ from the Austrian Pharmacopœia of 1820, as found in the *Pharmacopie Universelle* by Jourdan. This formula directs us to dissolve the iron in a kind

of aqua regia, and then to evaporate the superfluous acid by means of a sand bath. The sesqui-chloride thus obtained is employed in the preparation of "Bestucheff's tincture," by dissolving one ounce of it in an ounce of water, adding twelve ounces of ether and agitating, then decanting the ethereal solution, and finally mixing it with four times its bulk of alcohol.

Having had frequent occasion to prepare this tincture as well in Germany as in this city, it may not be unsuitable if I give here the formula for its preparation, which seems to me the most convenient, as well as my reasons for thinking so.

The sesqui-chloride of iron may be obtained in a pure and neutral state by passing a current of chlorine gas through a solution of proto-chloride of iron, until a solution of the red ferrocyanide of potassium of Gmelin no longer produces a blue precipitate, and then evaporating the solution by means of a water bath. In this manner the salt can readily be obtained in a crystalline form. One ounce of the crystals thus obtained is to be dissolved in twelve ounces of ether, if we retain the alleged proportions, mixed with four times its bulk of alcohol, and finally bleached by exposing it to the direct line of the sun.

The Prussian Pharmacopœia of 1846 gives the following proportions:—One drachm of the sesqui-chloride of iron, or two drachms of the aqueous solution, one fluid ounce of ether, and three fluid ounces of alcohol.

Here we have to notice,—1st, That it is preferable to take ether and alcohol by weight rather than by measure, since their volume is very much influenced by the temperature, which may range from 32° to 60° or 80°.

2nd, That the sesqui-chloride, prepared with nitro-muriatic acid, is not so easy to obtain in crystals, in consequence of the adhering nitro-muriatic acid, which is always retained in small quantities. On the other hand, by drying the salt you will, in almost every case, spoil a quantity of it by driving off too much of the acid.

3rd, That the sesqui-chloride of iron, if in crystals, is easily and wholly soluble in ether, while the aqueous solution of it is but partially so, a portion being decomposed, as is evidenced by the solution becoming muddy. The ethereal solution, if prepared in the last mentioned manner, must be of uncertain strength, which is avoided by the first.

In Europe Bestucheff's tincture is much used by physicians. It sometimes agrees better in the bleached state, sometimes when colored. When first prepared the tincture has a yellow hue, which it loses by exposure to the light of the sun. If, after it has thus been bleached, it is placed in a dark closet, it again becomes yellowish, though the color is not so deep as at first.—*New York Journal of Pharmacy, August*, 1852.

SULPHUR IN PYROLIGNEOUS SPIRIT.

By Reuben Phillips.

During the course of some recent researches, I was occasionally perplexed by the anomalous appearance of sulphur; and the following experiments were made to ascertain its source. As I cannot find that any one has yet noticed the existence of sulphur in pyroligneous spirit, perhaps these experiments may be acceptable to those who use pyroligneous spirit for fuel.

About 6 grs. of hydrate of soda were placed in a silver crucible, capable of containing about 1½ oz. of water. The soda was then fused, and the crucible inclined in various positions so as to line it with soda. The spirit to be tested was placed in a glass spirit-lamp holding nearly ¾ of a volume ounce,† and then the flame was driven into the crucible by means of a blowpipe, which was fed with air from a metallic vessel in which it had been strongly condensed. After the lamp-full of spirit had been thus burnt and the crucible had become cool, sufficient water was added to dissolve the saline matter; the solution was then filtered, an excess of hydrochloric acid added, and then a little chloride of barium. All the samples of pyroligneous spirit which I have obtained, when treated by this process, afforded an abundant precipitate of sulphate of baryta.

I satisfied myself, by a number of experiments with alcohol, that the process would not yield sulphur unless sulphur existed in the products of the combustion of the spirit.

† To prevent obscurity and circumlocution, I use the term *volume ounce*, or *vol. oz.* as equivalent to the *volume of an ounce of distilled water*.

12 vol. oz. of nearly colorless pyroligneous spirit were mixed with 20 oz. of water. After some hours the mixture was thrown upon a filter; the fluid that passed was scarcely at all milky, and but little troubled by a further addition of water. By this treatment nearly 5 vol. drms. of a slightly yellowish oil were separated. The filtered fluid was now rectified by a continued fractional distillation, and I thus obtained $5\frac{3}{4}$ vol. oz. of perfectly colorless pyroligneous spirit, having a specific gravity of about 0.867. This spirit was now mixed in a retort with powered chloride of calcium; on cooling, a thick mass was obtained intermixed with clear fluid. I did not saturate the fluid with chloride of calcium, thinking that an excess of chloride of calcium might render the separation of the sulphur compound more difficult. The retort was then placed in a water-bath. The distillation proceeded rapidly for a few minutes, but soon became very slow; the heat was, however, kept up for about $2\frac{1}{2}$ hours; $2\frac{1}{2}$ vol. oz. were obtained. 2 oz. of water were now added to the materials in the retort, and the distillation continued; the second product amounted to 7 vol. drms.

The product of the first distillation, namely the $2\frac{1}{2}$ vol. oz., on being tested, gave as much sulphate as so much crude spirit. The second quality, namely the 7 vol. drms., gave about a third of this quantity of sulphate of baryta. It now follows that the sulphur compound of pyroligneous spirit is not separated with the oily matter; and also, it may be confidently predicted, that the spirit can be obtained free from sulphur by a continued repetition of Sir R. Kane's chloride of calcium process.

An attempt was made to separate the sulphur by distilling pyroligneous spirit from a mixture of hydrate of potash and oxide of lead; but the distilled fluid contained as much sulphur as ever.

Sulphur can also be found in pyroligneous spirit by decomposing it in a retort with strong nitric acid.

A mixture of pure lamp-black and hydrate of soda, placed on a platinum capsule, and ignited for about twenty minutes by a lamp fed with pyroligneous spirit, gave rather a strong reaction of sulphate of soda. Consequently it is necessary to regard this source of sulphur in the incineration of organic matters.—*Chem. Gaz. July* 1852.

ON THE TINCTURE OF OPIUM.

The Pharmaceutical Society of Antwerp has employed a commission composed of its members to determine the best menstruum for the preparation of tincture of opium. It has arrived at the following results:

1. Good opium gives, when treated with water, less extract than bad or adulterated.

2. By warm digestion, a stronger solution is obtained than by cold infusion.

3. Alcohol must be preferred to wine in the preparation of tincture of opium.

4. Narcotine, although alone insoluble in water, becomes partially extracted with the other ingredients of opium. When it is advisable to avoid the removal of narcotine, proceed as follows: Treat carefully prepared aqueous extract of opium with boiling alcohol; this dissolves out the narcotine and morphine, from which solution, when cold, the narcotine separates.

After the precipitation, whatever ingredients are necessary to form the tincture are to be added to the alcoholic solution.

By this opportunity, the commission recommend another process by which morphine may be more readily separated from narcotine. One part of the opium is to be treated with four parts of alcohol. After the alcohol has been separated by filtration, the residue is again to be macerated with three parts of alcohol. The resulting tinctures, after being mixed, are to be set aside for twenty-four hours to allow the narcotine to separate; afterwards the morphine is to be precipitated with ammonia. To remove the last traces of morphine, the fluid from which the precipitated morphine has been filtered, is to be kept in a warm place for two days, a little water having been previously added, when a fresh quantity of morphine will fall down. By this method, one-twelfth of the weight of the opium employed, can be obtained as morphine.—*Annals of Pharmacy and Chemistry and N. Y. Jour. Pharm.*

ON THE CAMPHOR-TREE OF SUMATRA.

By Dr. W. H. De Vriese,
Professor of Botany in the Royal University of Leyden.

For many years past a distinction has been made between the Camphor-tree of Sumatra and Borneo, and that of Japan and China. The Japan or Chinese Camphor-tree is *Laurus Camphora*, L., belonging to the Laurels. It is a large and sometimes very thick tree, and may be recognized at first sight by its shining triple-nerved leaves. The camphor is partly obtained from this tree by incisions in the trunk, the juice that streams out being gathered in bowls. This method produces the purest camphor. Another kind is obtained by decoction and distillation of the wood in an iron pot, furnished with a cover, or covered with another oblong iron pot filled with straw or reeds. The camphor is sublimated by an elevated temperature, adheres to the straw, and and is exported to Europe in slices. Formerly, the camphor was only refined in Holland; the process is now known elsewhere also. This is the camphor commonly sold in Europe, and is generally of a low price. Several other plants, chiefly of the Order *Labiatæ—Mentha, Salvia, &c.*—contain camphor, but in a small quantity. The camphor of Sumatra and Borneo, as well as the tree producing it, was always supposed to differ from that of Japan and China. At a remote period it was thought to be more precious and more medicinal than that of Japan, and at the present day the camphor of Sumatra is sold at a very high price, particularly to the Chinese; that of Japan and China, on the contrary, may be purchased at a low price.

The most varying accounts of the history of the Camphor-tree of Sumatra are given both by earlier and more recent authors. Some of these notices may be considered as entirely contrary to the truth, others are inaccurate, and very few are exact. The examination of them all would occupy too much time.

The Camphor-trees of Sumatra and Borneo were mentioned in the latter part of the sixteenth century. The first mention of it occurs in the "*Eerste Scheepvaart der Hollandsche natie naar Oost-Indië*, 159[illegible]—7," to be found in "*Begin en Voortgangh van*

de Vereenigde Geoctrijirdee O. I. Compagnie; gedrukt in den jare 1646."

What is told us of this tree by Valentyn, in the year 1680, is in many respects remarkable, and proves at the same time, how much the tree was already considered worthy of attention. Mich. Bern. Valentyn gives the following statement on this subject, which was in 1680 communicated to him by Arent Sylvius:—

"The Camphor-tree is found in several forests. Without any culture or human aid, it grows luxuriantly like other forest-trees, and elevates its lofty, heavy, unbranched, and straight trunk, and forms a crown of moderate extension, but which may be called small in proportion to the trunk, and which is furnished with few and not heavy branches.

"The leaves are oblong ovate, with a strong, lengthened point ('apice prolixe extenso.') In a dry state they are of a dark green color. They are hard, tough, and smell like camphor. This is said of the tree of Baros, for in that of Java (that is, of Japan,) the leaves are differently formed and much larger than those of the tree first mentioned, as may be seen by the seventh plate of Valentyn.

"The bark is fine and reddish; when the tree becomes old and thick, it falls off in large pieces; by this property the tree may be partly distinguished from others. Roots several feet in length are also often to be seen above ground.

"The fruit, which is obtained with difficulty in consequence of the heighth of the tree, resembles more a flower than a fruit, as it has more or less an oblong and thick variously-colored leaves, which are generally red, violet, yellow or greenish, and enclose the fruit like a hazle-nut. The fruit has a hard shell; the enveloping leaves are elevated above it, and are not pointed, but have red tips, spread out above like the petals of a tulip. The fruit, which, like the leaves, has a taste of camphor, is not only useful for medicinal purposes, but may be employed as food, and, like many other fruits, makes a good confection. The fruit is not easily obtained, as it is dangerous to penetrate the woods.

When the tree has attained some size, the resin does not stream out like benzoin; but near the pith, or heart, are natural fissures,

in which the juice accumulates, which, gradually coagulating, sticks to the wood in the form of small pieces of camphor.

"If those who have the care of the Camphor-trees, perceive that in some of the trees there is camphor, (which they pretend to discover by some signs known to them,) they order the trees to be cut down, strip them of their leaves and bark, and cut away the outer wood to the marrow or heart, in which are the apertures or fissures; they cut that wood into small pieces, and therein the camphor is found, beautifully brilliant. They have a method of scraping it from the wood with small instruments; and after purifying the scraped-off camphor (*camphora abrasa*) they seldom obtain more than from two to three pounds. Of that, one-twentieth is generally paid as a tribute; the rest remains in their possession.

"Camphor-oil, the peculiar juice of the tree, exudes from its fissures and cavities, and is carefully collected. The oil is so fine, that a paper penetrated by it and held near a flame, catches fire immediately and burns till all the oil is consumed. Oct. 2, 1680." *

We must not omit to mention that Valentyn† has given a drawing of the leaves of the Camphor-tree of Baros, which agrees very well with the objects before us, so that we do not doubt that Arent Sylvius, from whose accounts this chapter is written by Valentyn, really knew the tree, and in what respects it differs from that of Japan.

I would recommend further the notices given of this tree by Breyne,‡ Grimm,§ Rumphius,‖ Miller,¶ Adolph Eschelskroon,**

* Valentini, *India Literata, seu dissertationes epistolicæ de plantis, &c.*, p. 488. Francof, 1716, fol.

† Mich. Bern. Valentini, *Hist. Simpl. Reformata*, lib. ii. sect. iv., p. 250.

‡ *Prodr. fasc. Pl. rar.* 1680.

§ *Obs. de Arb. Camphoræ, in Miscell. Cur. sive. Ephem. Nat. Curios.*, 1783, p. 371, tab. c. f. 33.

‖ *Herb. Amb. Auct.*, cap. lxxxii., p. 67. 1755.

¶ Extracts from several letters from Mr. Charles Miller, giving some account of the interior parts of Sumatra.—*Phil. Trans.*, vol. lxviii, p. 161, 170. 1778.

** *Beschr. van Sumatra, insonderheid van desselfs Koophandel. Door Ad Eschelskroon*, p. 61, 63. 1783.

Rademacher,* Houttuyn,† Gærtner,‡ Colebrooke,§ Roxburgh,‖ and William Jack.¶

I will here repeat the diagnostic description given of this tree elsewhere, founded upon specimens from Sumatra, collected by Dr. Junghuhn.

DRYOBALANOPS, *Gærtn., Colebr., Jack.*

Calyx inferus, monophyllus, cupulatus, limbo demum 5-alato, alis patentibus. *Corolla* infera, 5-partita (vel 5-petala, petalis basi junctis), laciniis ovato-lanceolatis. *Stamina* hypogyna, plurima, monodelpha, annulo in basi corollæ inserta; antheræ subsessiles, biloculares, elongatæ, lineares, loculis membranaceis, mucronatis. *Ovarium* superum, ovatum, stylo post anthesin sæpe persistente acuminatum, triloculare, loculus biovulatus. *Stylus* filiformis, staminibus vix longior. *Stigma* vix distinctum (nec capitatum). *Capsula* unilocularis, trivalvis, monosperma, calyci aucto partim insidens, partim ejus, laciniis auctis alæformibus cincta. *Seminis embryo* exalbuminosus, inversus, cotyledonibus inæqualibus carnosis chrysaloideo-contortuplicatis.—Arbores *excelsæ Sumatram insulam habitantes*, foliis *alternis coriaceis;* stipulis *caducis;* floribus *paniculatis, terminalibus et axillaribus.*

Dryobalanops *Camphora*, Colebr.; foliis ovatis obtuse acuminatis basi-acutis superne nitidis dorso apacis parallele venosis carinatis.

HAB. Region. 1-000′; prope Tapanuli et Huruba.

SYNONYMA.

De Arbore Camphoræ litera Wilhelmi ten Rhyne ad Jacob Breynium: Prodr. ej fasc. rar. plant. Gedani, 1683.

Arbor Camphoræ, Grimm, Observ. in Miscell. Cur. sive Ephem. Nat. Curios. 1683, p. 371, cum tab. fig. 33 (mala).

Arbor Camphorifera, Valentini, Ind. lit. p. 488, 1716, ex auctoritate Arent Sylvii.

Arbor Camphorifera, Mich. Berhn. Valentini Hist. Simpl. Reformata, lib. ii. sect. vi., p. 250. Rumphii Herb. Amb. Auct. cap. lxxxii., p. 67. 1755. Ch. Miller, in Phil. Trans. vol. lxviii., p. 1, pp. 161, 170, 188.

* *Verhand. van het Bataviaasche Genootschap*, vol. iii., p. 27. 1785.; vii. *Batavia.* 1814.

† *Verh der Holl Maatsch van Wetense*, pl. vii. 1784.

† *Suppl. Carpol.*, vol. iii. p. 49.

§ *Asiatic Researches*, vol. xii., p. 537. 1818.

‖ *Flor. Ind.*, vol. ii., p. 617. 1832.

¶ Hooker's *Companion*, vol. i., p. 253. 1835.

Lauras foliis ovalibus acuminatis lineatis, floribus magnis tulipaceis, Houttuyn, Nat. Hist. ii., 2, pp. 318, 319; Verh. Holl. Maastch. van Wet. xxi. 272.

Dryobalanops aromatica, Gærtn.? Suppl. Carpol. vol. iii. 49.

Dryobalanops Camphora, Colebr., Asiatic Researches, vol. xii., p. 537, 1818.

Dryobalanops Camphora, Colebr. in Jack's Descr. of Malayan Plants Hook. Com. vol. i., p. 253. 1835.

Shorea Camphorifera, Roxb.? Fl. Ind. vol. ii., p. 517. 1832.

Pterygium teres, Correa? Ann. du Mus. vol. x., p. 159, t. 8, f. 1.

Dryobalanops Camphora, Colebr. in Hayne's Arzn. Gew. xii., 17.

Dryobalanops Camphora, Colebr., Korthals, Verh. over de Nat. Gesch. der Oost-Ind. Bezitt. (Kruidk.) p. 45.

ADUMBRATIO.

Arbor 100′; trunco valido, stricto, columnæformi, 60′–70′ alto, 11′ crasso, ad basin expansionibus laminaribus, radiantibus instructo; cortice exteriore ibidem fisso, scabro, strato resinoso, splendente, partim albo flavescente, sæpe crasso, pelucidoque irstructo; sursum fusco, demum in ramis ramulisque e griseo-fuscescente obtecto. Lignum ipsum fuscum.

Folia alterna (nec opposita), petiolata; petiolis dorso rotundatis, superne sulcatis, sæpe curvatis vel inflexis et ramis accumbentibus, 0,01–0,02 longis, immo longioribus; ovatis, basi acutis, apice subito angustatis, obtuse acuminatis, margine integerrimis, versus apicem subundulatis, utrinque glabris, coriaceis, superne nitentibus, medio sulcatis, dorso opacis carinatis, parallele venosis, demto petiole 0,06–0,07 longis, et 0,33 fere latis.

Stipulæ germinatæ, subulatæ, caducæ (Colebr.); ovatæ acutæ, (Korth.); in speciminibus Junghuhnianis nullæ. An forsan omnes lapsæ?

Pedunculi axillares et terminales, breves, incrassati.

Calyx (junior non visus) adultus auctus, hemisphæricus, campanulatus, basi lignosus, admodum crassus; interna structura magnum referens numerum lacunarum aërearum, in quinque excrescens alas foliaceas, coriaceas, rigidas, erectas, patentes, reflexas, sinu exciso rotundato amplo a se invicem distinctas. Alarum formæ et diametri diversæ sunt pro diverso evolutionis stadio; in fructibus immaturis magis sunt elongatæ, et versus medium et apicem dilatatæ, 0,07 longæ et fere 0,01 latæ (spec. Houtt. et Jungh.) et in illo stadio quoque erectæ; in maturis (Colebr.) contra magis dilatatæ, vere spathulatæ, reflexæ. Structura alarum est parallele nervosa et inter nervos, reticulata. Calyx totus terebinthinam redolet.

Carolla (secundum specimen lectum a Millero fil. et nobiscum communicatum ab Ill. Rob. Br. ex Mus. Brit. Lond.), caduca, monopetala, 5-partita, laciniis, ima basi inter se coalitis membranaceis, 0,015 longis, 0,004 latis, lanceolatis.

Stamina in fundo corollæ annulo proprio dentibus triangularibus acuti, erectis instructo insidentia, numerosa. In specim. Mill. 15 numeramus sed plura lapsa sunt. Filamenta brevissima; antheræ biloculares, introrsæ, in dorso linea media (connectivo) in mucronem ultra loculos elongata notatæ; loculi membranacei, tota longitudine dehiscentes, marginibus loculorum involutis.

Capsula glandem quercinam simulans, supera, ovata, stylo coronata, lignosa, fusca, externe striis longitudinalibus tenuibus prædita, basi cupula rotundato-gibba hemisphærica excepta, eique firmiter adhærens, unilocularis, trivalvis, valvis æqualibus crassis, monosperma, 0,035 longa, 0,015 lata, (Colebr.), 0,03 longa, 0,015 lata (Gærtn. si eadem est ejus species quæ, Colebrookii, quod incertum.)

Semen solitarium, magnum, cavitati capsulæ respondens, ovato-oblongum, antice sulcatum, integumento fusco ad sulcum intus flexum, et cum columna centrali colliquescens. Columna centralis e fundo cupulæ calycinæ oriunda, ad verticem adscendens, semen in illa directione in duos dividens lobos dorso connatos, inde aucta; lobis longitudinalibus, mollibus, columna brevioribus, intra cotyledonum plicas sese demergentibus; duobus majoribus lateralibus ad ventrem recurvis; duobus minoribus dorsalibus citra axem productis divergentibus .Gærtn.)

Albumen nullum.

Embryo constans 2 cotyledonibus, carnosis, imparibus. Externus maximus, seminis formam constituentibus; interior multo minor, lateralis, subcochleatus. Plumula simplex, conica, diphylla. Ridicula longa, sursum directa, in sulco cotyledonis externi contenta, apice conico obtusiusculo terminata, adscendens, supera. (Juxta spec. Marsdeni Mus. Brit. Londinensis et descript. Cel. Gærtn.)

The tree here described belongs to the Natural Order *Dipterocarpeæ* (Bl. Lind.) All the trees belonging to this family are gigantic and of a majestic appearance, and are chiefly remarkable for the beautifully colored and winged fruits. All of them contain more or less of a balsamic resin. *Shorea robusta* produces a resinous substance which is used at the religious solemnities of the Indians. *Vateria Indica* yields a resin which in India is used as copal, and is known in Europe as *anime*-resin. The Javanese species of *Dipterocarpus* are all resinous, and the resin is said to be used as copaiva-balsam.

The camphor-tree is one of the loftiest of the Indian Archipelago. In its dimensions it surpasses even the rasamala-tree (*Altingia excelsa*) of Java. It is the giant among the trees of the East Indies. Its trunk rises vertically, and divides into branches only

at the top, forming a somewhat convex crown. A person looking over the tops of the trees from an elevated place, for instance, from the mountains behind Loemoet, at a height of from three to four hundred feet, can, without difficulty, count the full-grown camphor-trees that are scattered in the forest; for, while the *Anonaceæ*, *Acacias*, *Fagrææ*, and figs, which compose the chief mass of trees in those forests, are eighty or even a hundred feet high, the camphor-tree, with its gigantic crown, is seen rising fifty or even a hundred feet above them, as the steeples of churches appear above the roofs of the houses in a town. The following are its dimensions, compared with those of the rassamala (*Liquidambar Altinghiana*):

	Thickness of the trunk.		Length of the trunk.	Diameter of the crown
	Beneath.	Above.		
Camphor-tree	7–10 feet	5–8 feet	100–130 feet	50–70 feet
Rassamala	5–7	3–5	70–90	40–50

Near the ground the Camphor-tree gives out radiating extensions of the trunk and root, such as several travellers have represented in their descriptions. At the lower part of the tree the bark is rugged, with fissures, and often covered with a resinous and glittering, sometimes yellowish substance, which is transparent, and consists either of camphor or of camphor and its peculiar resin. Higher up, the bark is of a dark grey color, here and there covered with lichens, but not with *Lianes*, like so many other trees.

The position of the leaves is alternate, as shown in the drawing of Houttuyn. Colebrooke describes a branch without fruits, *with opposite leaves*. Has *Dryobalanops Camphora* sometimes a position of leaves such as Colebrooke describes? We can scarcely doubt the accuracy of his descriptions—they have too much the appearance of truth about them; and all that he has communicated of the tree and of the substances which it produces, gives us the conviction that M. Colebrooke must have had specimens

of this tree; we are not, however, certain of the correctness of his figure.

The leaves seen by us differ from those of Miller's specimens, which we saw in 1850 in the British Museum, (which are much larger,) and from those of Colebrooke's drawings and descriptions; the largest leaves of the latter being 0,175 long, and 0,05 broad. But this difference is perhaps explained by ours being smaller because they are on flower-bearing branches. They most resemble the description given by Houttuyn.

Most authors speak of stipules (Colebr. Korth.) We have not seen them, and suppose that our specimens have lost them; we must therefore refer our readers to what the two last-mentioned botanists have written on the subject.

The calyx has many modifications in the form of its base and wings, as well as in the direction of those wings, which are sometimes nearer to each other, or more modified or reflexed. The great diversity which we have observed in our specimens persuades us that there is no reason for accepting more species. Colebrooke has seen and drawn objects in full growth. In the different states of developement in which we saw this calyx, we always found natural cavities in its tissue, chiefly in the woody part. In the interior it is resinous, and emits a smell of turpentine.

We have not space for further descriptions of the crown, the stamens, and the fruit. The albumen seen by us was in some of Marsden's specimens in the British Museum, preserved there in spirits; it agrees entirely with the figure and description given by Gærtner. In the specimens at our disposal, which were not preserved in spirits, the albumen was consumed. For these specimens we are much indebted to the liberality of Mr. Robert Brown. Through lack of young specimens, the structure of the ovary has been till now but imperfectly known. The reason is, that naturalists have not had the opportunity of getting specimens at the time of the devlopement of the flowers.

Dryobalanops Camphora, Coleb. must be the plant mentioned by Grimm, Rhyne, Valentyn, and Rumphius. It is the same as that mentioned by Miller, and which M. Rademacher presented to Houttuyn. It belongs undoubtedly to the same genius as

Gærtner has represented as *Dryobalanops*, but it is doubtful what he means by his *D. aromatica*, which he says occurs in Ceylon, and yields the best cinnamon. Here may be an error. The uncertainty is increased by his not giving characters of the species; and the identity with the species of Colebrooke cannot be decided. There seems to be some mistake in the account of Gærtner, for no *Dryobalanops* has ever been found in Ceylon, and it is impossible that a *Dryobalanops* should produce cinnamon, and that even the best in Ceylon. Perhaps he was misled by inaccurate statements on the labels of some of Sir Joseph Bank's specimens. Hitherto our efforts to arrive at some certainty in this case have been unsuccessful. If it be decided that the plant mentioned by Gærtner is the same as that of Colebrooke, then, according to the opinion of some botanists, there would be a reason for adopting the name *D. aromaticæ* of Gærtner, instead of that of Colebrooke. But, first, that reason does not yet exist; and we think that we should maintain the system established among botanists, that no priority can be given in science to a name of a plant unaccompanied by a description. It is possible that Gærtner had the description of his species in manuscript, but he did not publish it. *Shorea*, Roxb. and *Pterygium*, Corr., have been described later than Gærtner's *Dryobalanops*, and must therefore be represented here as synonymous.

Geographical Distribution.—The region in which the camphor-tree is found, extends, in latitude, from Ajer Bangis to Singkel, or nearly from 1° 10′ to 2° 20′ N. It is not met with more southward than Ajer Bangis; whether it grows further north than Singkel is unknown (Jungh.) Within these parallels it extends along the south-western side of Sumatra, from the coast to a considerable distance in the interior, and is found on the mountains as high as from a thousand to twelve hundred feet. As those mountain-chains which are near the coast, and most of the central valleys of the mountains which extend parallel to the coast, that is, in a direction from S. W. to N. E., are much higher than 1000 feet, it is clear that this tree has a very limited region, occupying but a small part of south-western Sumatra: it is also confined to the outer slope of the mountains, whence it descends into the alluvial plains, though it approaches the sea only in those parts where the ground

is not swampy. It is found most abundantly, and in the best state on the out-lying hills of the mountain-chain and on the lower slopes of the mountains themselves, at a height of from three to five hundred feet; and here the camphor is collected in the greatest quantity

The camphor-tree was seen by Dr. Junghuhn on the promontory of Caracara, near Telo; on the alluvial plain of Loemoet, on the mountains of Hoeraba, behind Sibogha; and on the ridges of hills in the south of Loemoet, &c. He found it growing on weather-beaten granitic and trachytic hills, on yellow-red clayey soil, abundantly furnished with oxide of iron, and also on a rich alluvial soil abounding with humus.

Climate and Temperature of the region of the Camphor-tree.— On the coasts the mean annual temperature is but 80 ° (on the island of Java 82°,) and nearly 78° Fahr. at 1000 feet, the most elevated limits where the tree is still found, thus much lower than in Java.

There are two causes particularly, that bring about this depression of temperature: first, the narrowness of the level shore of the coast, immediately at the foot of high mountains; secondly, the uninterrupted dense forests, with which not only the mountain-chain itself, but the coast-plain is covered. These circumstances produce a greater humidity, and at the same time a greater coolness of the air, at an inferior elevation, than in Java.

At the eastern foot of the Sumatra mountain-chain there are extensive arid and barren plains, only overgrown with alang-alang (*e. g.*, at Pertibi.) Over the heated soil of these plains the air becomes extraordinarily rarified: the cooler sea-air rushes in, coming from the ocean on the western side of Sumatra, where the sea is deep, and where no land exists for a great distance; and a west wind arises, which, partly kept back by the obliquely situated mountain-chains, changes into a north-western one. This wind carries the humidity of the sea towards the mountains, by the summits of which the moisture is soon condensed and changed into clouds. These, during the whole year, at intervals almost daily, at regular hours, but chiefly in the afternoon, shed heavy showers over the land, while the thunder roars in the mountains. The dampness of the air is then so great, that mist and clouds are for many days seen hanging immoveably even over the woods of the lower coast-lands. Frequently, too, the wind blows by reverber-

ation, in an opposite direction, like a hurricane, from the mountains to the coast.

Thus the camphor-tree grows in a very changeable and generally moist climate, where extreme states of heat and coolness by storm quickly follow each other. About eleven in the morning, in the serenest weather, there is frequently an oppressive warmth, while at noon heavy showers, driven on by a north-west wind, and accompanied by thunder and lightning seem to cover the land.

Surrounding Vegetation.—One consequence of the unsettled character of the climate, of the low elevation of the clouds, and of the cooler temperature in general, is the occurrence of some trees and plants near the sea-coast, which in Java are met with only at a greater height. Thus the camphor-trees grows often in company, not only with species of *acacia*, *anona*, *michelia*, and *dipterocarpeæ*, but also with oaks; and it is found with marsh *casurinæ*, with the Nipong Palm (*Oncosperma filamentosum*,) and with benzoin-trees. Amidst the underwood of the forest are seen species of *melastoma*, *elettaria*, and other *scitaminæ*, with *Vitex trifoliata* (which occurs most frequently,) and several species of *rubus*. These plants are seldom found in Java below 3000 feet.

Signs of the presence of Camphor in the tree.—According to the observations of Dr. Junghuhn, the young trees do not contain camphor. The inhabitants of the Battalands are accustomed to cut the oldest and heaviest ones, although the age of the trees is not known; and in reference to a large camphor-tree which he saw near Tapanuli, the Rajah Ngabing told him, that his ancestors, as far back as the history of his family went, had known it of the same size. It was probably at least two hundred years old.

Camphor-oil and Camphor.—Camphor-oil, that is to say liquid camphor, occurs in all the trees, even in young ones, and exists in all parts of the tree, but most in the younger branches and leaves. The solid camphor is, however, found only between the woody fibres, and, therefore, only in the trunk. The natives do not know beforehand whether a trunk contains much or little camphor. If, however, there is a large quantity of camphor in the splinters or fibres of the wood, they decide that the fissures of the inner part contain a great abundance. When much gluey, half-solid young camphor shows itself on the radiating extensions, or in the fissures at the lower part of the trunk, they come to the same conclusion.

However, the results are frequently fallacious, and they often uselessly cut down trees which produce but very little.

Collection of the Camphor.—The process of collecting the oil and camphor from *Dryobalanops camphora*, was witnessed by Dr. Junghuhn, near Loemoet (Tapanuli,) in Sumatra, at an elevation of 300 feet. The greatest quantity of camphor, in a solid as well as in a young and liquid state, is brought from a height of 1000 feet. The solid camphor is obtained by cutting down the trees, in the inner part of which fissures are found between the woody fibres, which extend longitudinally, and are filled with camphor. The young trees do not contain that substance, while the thickest and oldest, that are most filled with it, rarely contain more than two ounces. The natives who are occupied in collecting the precious product, go in a number of twenty or thirty men into those parts of the woods where the camphor-tree is most often found. They commence constructing cottages, intending to encamp upon the spot for some months. One-half of the company is occupied with severing the trunk near the root, and not, as many others have said, at from fourteen to eighteen feet above the ground. The others are engaged in gathering the camphor from the trees which have been cut down. From the extraordinary thickness of the trunks, it often happens that a whole day is employed in fellinga single tree.

On his second expedition from Loemoet to Pertibi, in the year 1841, Dr. Junghuhn visited the bivouac of such a company in the neighborhood of Hoeraba, and by this means became acquainted with the method by which the natives obtain camphor or camphor-oil from the tree.

The oil is collected in the following manner:—

1. Incisions are made through the outer and inner-bark, at the lower part of the trunk close to the root, chiefly where the tree produces the before-mentioned woody radiations, which alternate with vertical cavities, which are also observed in other trees growing between the tropics. The clear, yellow, balsamic, oily juice, which is discharged very slowly, is collected in a half-cylinder of very thin bamboo, cut longitudinally. According to the observation of Junghuhn, who witnessed it, half a day was scarcely sufficient to half-fill a small tea-cup with this liquid, and even that small quantity was mixed with fragments of bark and other impu-



rities. The collected juice is purified by pouring it through a kind of sieve, made from the fibrous tissue of the sheathing footstalk of palm-leaf (*hindoe*.)

The camphor is found as a varnished, gluey, and clammy covering, resembling turpentine, or in a solid grainy state, in the fissures of the bark, and in the laminary prominences. The surface near the root has chiefly a white covering, which is rarely thicker than one or two millimetres. This substance is highly estimated by the Battas, and fetches a high price.

Colebrooke, and many other authors who have written on this subject, have said that the camphor is obtained from the middle of the trunk, and that every tree should produce a quantity of eleven pounds; the camphor being found in the heart of the tree in such a quantity as to fill a cavity of the thickness of an arm. This is quite exaggerated, and must be founded on an error. If it were true, the price of camphor would be lower than it is now. At Padang and at Tapanuli the price of a hundred pounds of camphor is nearly £250. Such a quantity would in that case be obtained from nine trees. That proportion is highly improbable, and suffices to show the inaccuracy of the account. On the contrary, the camphor only occurs in fissures of the wood, and the native of the Battas scrape it off with small splinters or with his nails.

2. By maceration and decoction of the branches and pieces of bark and wood, another liquor containing camphor is obtained, but still in small quantities, and much mixed with water. The wood is cut into small fragments, and the leaves are bruised and boiled with water in an iron kettle, at the time that the trunk is being cut down, in order to use the pieces in their fresh state. In boiling, an oily substance rises to the surface, which is taken off with the shell of a cocoa-nut cut in half and provided with a handle. The liquor is poured into a bamboo, and closed in with a stopple formed of *hindoe* fibres, and at the return of the expedition after many months it is poured into bottles. Dr. Junghuhn has two bottles filled with the liquid at the place itself.

After a long stay in the woods (frequently of three months) the company, consisting of thirty persons, departs. It frequently happens that during that period they fell more than a hundred trees, and yet they rarely take with them above fifteen to twenty pounds of solid camphor, worth £40 to £50.

Use and Price of the Camphor in Sumatra.—Camphor is here collected in a comparatively small quantity. While some thousands of quintals of benzoin are yearly sent into the European markets (*e. g.*, in 1837 three thousand,) but ten to fifteen quintals, and often less, are sent of Sumatra camphor. The price is £2 10*s.* a pound. It generally comes from Baros, whence the name of Baros camphor. From that place several cavarans set out yearly to collect this substance in the woods. The same product comes from Tapanuli, Natal, and Ajer Bangis. It is not exported, for it is collected for the use of the natives wherever the tree grows.

Besides the small quantity which is employed as a remedy against various diseases, we must mention here a particular use, by which a great deal of camphor is wasted, and its rarity and price much increased; and this lavish application of it, together with the slaughter of hundreds of buffaloes sometimes in one day, is one of the principal causes of the poverty of the Batta royal families (Rajahs.)

A very ancient custom prescribes, that at the death of a considerable person among the Battas, who, during his life, had a claim to the title of Rajah (sovereign prince,) rice be sowed in a sacred place, and that the corpse be kept above ground among the living till the rice has sprung up, grown, and borne fruit. Not before the rice is ripe and gathered in do they think it right to bury the corpse, and it is actually interred with the ears of the rice that was sown on the day of the decease. Thus the burial takes place after five or six months. (The remarkable ceremonies of such a funeral are elsewhere described by Dr. Junghuhn.) The corpse, like the rice-grain six months before, is then committed to the earth; and thus the hope is emblematically expressed, that, as a new life arises from the seed, another life shall begin for man after his death.

During the period previous to interment, the corpses are preserved in wooden coffins within the houses, the women wailing day and night. Trunks of *Durio Zibethinus* (the Durian) are hollowed out to contain the bodies. They are carved with much art, and have at the under part small apertures, through which the fluids may escape. The corpses contained in these coffins are not only spread over with pounded camphor, but entirely covered with it, in such a manner that all the space between the coffin and the

body is filled with it. This is the only means known to the inhabitants of the Batta-lands of preserving the bodies of their kings, without smell or corruption, during so many months, in the humid air of such a hot climate. Dr. Junghuhn saw a corpse which had been preserved in this manner during four months, and which was shrunk up like a mummy, and emitted no smell but the penetrating odor of the camphor.

In this way an immense quantity of camphor (a quarter to half a quintal) is consumed, for the purchase of which the family of the deceased king must make the greatest sacrifice, and often sell all their cattle. Every village has such a rajah.—*Lond. Pharm. Jour. July* 1852.—*from Hooker's Journal of Botany.*

ON COD-LIVER OIL.

By Dr. F. L. Winckler.

The constituents of genuine cod-liver oil, are, according to Dr. De Jongh's analysis:—

Gaduin? (a so-called organic substance)	Bilifulvin
Oleic acid	Iodine, Chlorine and Bromine
Margaric acid	Phosphoric acid
Glycerine	Sulphuric acid
Butyric acid	Phosphorus
Acetic acid	Lime
Fellinic acid	Magnesia
Cholic acid	Soda
Bilifellinic acid	

Hence, therefore, its composition would be quite analogous to that of the other fatty oils; but with the addition of small quantities of some of the constituent parts of the bile and also of iodine, bromine and gaduin. But my own investigations have led me to regard cod-liver oil as an organic whole, of a peculiar chemical composition, differing from that of all other fatty oils hitherto employed as medicines. I prove this assertion by the following facts.

1. If genuine cod-liver oil from Berg (the light clear sort) be saponified with potash, and the thus obtained and purified soap be decomposed bytartaric acid,we obtain oleic and an inorganic acid.

2. If a mixture, consisting of a solution of six parts of caustic potash, twenty-four parts of distilled water, and twenty-four parts of cod-liver oil, be left for several days standing at the ordinary temperature and frequently shaken, then diluted with twenty-four parts of distilled water, and distilled, the distillate possesses the most intense odor of cod-liver oil, and contains a considerable quantity of a peculiar organic compound: oxide of propyle.

3. If nine parts of cod-liver oil be saponified in a porcelain vessel, by five parts of oxide of lead in the water-bath, and the required quantity of distilled water added, the cod-liver oil is decomposed into oleic acid, an inorganic acid, and a new acid, namely, *propylic acid*. The greatest portion of this acid, as well as of the oleic and inorganic acids combine, as it appears, with the oxide of lead, to form a basic compound. Another, very probably, acid salt of lead, can be extracted from the plaster-mass by washing it with distilled water. Not a trace of the hydrated oxide of glyceryle is formed on this occasion. The mass smells very disagreeably of train oil and herring, and if exposed in very thin layers in the water-bath, to the influence of atmospheric air, it assumes a dark-brown color after the water is evaporated, at the same time the disagreeable odor for the most part disappears.

This colorization is a consequence of the strong tendency of the propylates to become oxidized, and by this to become dark. If the solution of acid propylate of the oxide of lead be treated with sulphuretted hydrogen, and the sulphuret of lead be removed, we obtain a perfectly colorless solution, which has a strong acid reaction, becomes colored by evaporation in the water-bath, loses the very disgusting odor of train-oil, and at last leaves an intensely brown colored residue. Exactly the same is the case with the watery solutions of the neutral propylates of baryta and ammonia. The perfectly neutral, colorless, but undecomposed solution of the ammoniacal salt smells of herrings, but that of the salt of lead smells like concentrated broth.

4. If a solution of cod-liver-oil-soap, prepared as stated in No. 3, be distilled in a suitable spacious distilling apparatus, with an addition of caustic lime and chloride of ammonium (in the proportion of six drachms hydrate of potash, three ounces of cod-liver oil, six ounces of water, six ounces of fresh burnt caustic lime, and

one drachm of chloride of ammonium,) with the precaution that the mixture of lime and chloride of ammonium be added to the soapy mixture previously introduced into the retort, so that the lime mixture be perfectly impregnated by the latter, the generation of hydrate of lime takes place upon the application of a slight charcoal fire, with a rather strong heat; at the same time a colorless liquid, clear, like water, is distilled over, and this is a *concentrated aqueous solution of propylamine*, without free ammonia. The crystallized sulphate of propylamine is easily obtained from this solution by saturating it with diluted sulphuric acid, and precipitating the resulting salt with spirit of wine.

This very simple experiment is sufficient to prove with certainty the proportion of the oxide of propyle in cod-liver oil; the propylamine possesses all the properties of that obtained from the brine of herrings or from ergot of rye.

Conclusion.—Cod-liver oil, when saponified with potash, yields oleic and margaric acids, and oxide of propyle; with oxide of lead it forms oleic and margaric acids and a pure highly oxidized matter from propyle, namely, *propylic acid*. In neither case of saponification *is the hydrated oxide of glyceryle* obtained; the *glyceryle* ($C_6 H_3$) is replaced in cod-liver oil by *propyle* ($C_6 H_7$). The generation of *propylamine* ($NH_2 C_6 H_7$), on the addition of ammonia, takes place only in cod-liver oil, and in no other officinal fatty oil, and its place in the Materia Medica cannot, therefore, be supplied by any other oil.

It is not my intention to draw, from these investigations, any conclusion as to the medicinal efficacy of cod-liver oil. I am not a physician; but when we reflect that the fat assimilated by the animal organism serves chiefly as a material for the process of respiration, the possibility of cod-liver oil undergoing during this process a decomposition similar to that which it undergoes by the influence of alkalies, is very plausible; and when we further consider that in such a decomposition, by the presence of the conditions requisite for the formation of ammonia, which, indeed, are never wanting in the animal organism, the formation of propylamine is highly probable, it is not surprising why cod-liver oil alone should prove so advantageous in many diseases, even exclusive of the slight proportion of iodine; and I think myself justified in concluding that the efficacy of this oil depends chiefly upon the

peculiar chemical composition which I have discovered; as propylamine, according to my experiments, is to be found also in the normal urine and sweat.

The importance of the small quantity of iodine contained in the oil I shall endeavor to determine by subsequent experiments; for the present I shall only observe that both the *oxide of propyle* and the *propylamine* are chemically very closely related to iodine, the first forming with it a compound (iodide of propyle,) similar to iodide of formyle (iodoform,) which becomes very easily decomposed.—*London Pharm. Journ.*, July, 1852, from *Buchner's Neues Repertorium fur Pharmacie.*, Bd. I. H ft. 4, p. 165.

PREPARATION OF PROPYLAMINE FROM ERGOTINE.

By Dr. F. L. Winkler.

The readers of the *New Repertory for Pharmacy*, part i., p. 22, already know that I have been for some time occupied with the investigation of ergot, and that I obtained, by the distillation of ergotine with potash, besides ammonia, a substance having a very unpleasant odor, which conducted itself as a volatile alkali, and possessed a narcotic and highly diuretic property. This confirmation of a result which I had obtained some years before, induced me to continue my experiments, and I have now arrived at the conviction that the volatile alkali which is extracted from ergotine by distillation with potash is propylamine ($N H_2 C_6 H_7$, or $N H_3 C_6 H_6$,) consequently the same which, according to the most recent experiments, is proved to be the product of decomposition of narcotine by potash, and the ingredient of herring-pickle. The smell itself made me imagine, long before I was acquainted with Wertheim's experiments, that herring-pickle must likewise contain propylamine, and my experiments have fully confirmed this supposition, for in distilling herring-pickle with potash I obtained the same propylamine as that extracted from a concentrated aqueous solution of ergotine. The properties in in which they agree are the following:—

1. Propylamine saturates acids completely, and thus forms salts soluble in water, and for the most part in spirit of wine,

with the exception of sulphate of propylamine, which does not dissolve in the latter. Beautiful white crystals may, however, be produced from the concentrated aqueous solution by the admixture or alcohol of eighty per cent. of strength. The salts of propylamine dissolved in water and treated with tannic acid, produce a white (flocculent) precipitate; with chloride of mercury likewise a white but pulverulent precipitate: with nitrate of silver a white (flocculent) precipitate; and with chloride of platinum a yellow precipitate (a crystalline powder.) The salts of propylamine have a strong odor of fresh ergot, much less of herring-pickle, and are easily decomposed by potash.

2. The concentrated aqueous solution being mixed with a fourth of its volume of tincture of iodine, a considerable dark yellowish-brown sediment is precipitated, and the supernatant fluid appears dark brownish-red. But in a very short time this sediment diminishes considerably, the fluid gradually changes color, so that in about twelve hours' time there will be left but very little orange-colored sediment, whilst the fluid itself will appear almost colorless. Immediately after the addition of iodine the very disagreeable odor of propylamine disappears, and the mixture acquires the odor of iodine.

3. When the neutral aqueous solution of sulphate of propylamine is evaporated in a water-bath it exhales a very disagreeable odor of herring, the solution becomes very acid, has only a weak odor of ergot, and all the reactions cease. If this concentrated solution be digested with caustic lime in a still, there comes over, without the aid of artificial heat, almost pure propylamine, which has the odor of an ammoniacal liquid, and produces all the reactions of pure propylamine.

Now the propylamine of ergot presents the very same results, and it is on this account that until lately it has always been mistaken for ammonia. I am convinced that it constitutes the odorous principle of urine, perspiration, and in the blood, and is often the cause of the odor which we observe in the action of alkaline lyes upon nitrogenous compounds. Propylamine belongs to the organic bases, and may be considered as the adjunct [*Paarling*] of ammonia. I think I am justified in concluding, from the results of my experiments, that propylamine, *combined with an acid*, pre-exists in ergot as well as in herring-pickle, and

is not produced by the potash, as is the case with narcotine. I have previously demonstrated the presence of formic acid in ergot, and it is with that acid that the propylamine seems to be united. I have not yet made any experiments with herring-pickle.

It will not now be difficult to determine whether the medicinal activity of ergot depends on propylamine or not, for the neutral salts of propylamine dissolved in water are easily absorbed, and I hope to be able to induce physicians to make pharmacological and therapeutical experiments.

I have reasons to suppose that propylamine is likewise an ingredient of cod-liver oil, and being easily combined with iodine, it may be soon ascertained by practical application whether it ought not to be considered as the bearer (*träger*) of iodine. I propose to begin the necessary experiments in this respect as soon as my apparatus is entirely free from the odor of propylamine, in order to avoid all error.

Finally, I had the idea of trying an experiment with regard to propylamine upon my own urine, which I made after a supper consisting of roast veal, potato-salad, and a glass of water, and which was neither acid nor alkaline. I poured three ounces of the urine, fresh made and still quite warm, upon four ounces of burned lime, and submitted it to distillation. The distilled product had indeed the odor of pure propylamine, and reacted strongly alkaline; but acted in a remarkable manner on tincture of iodine in the same way as liquid ammonia. After having neutralized it with sulphuric acid, the liquid showed, when tested with tannic acid and nitrate of silver, an unmistakable proportion of propylamine. Might this be formed out of the urea? My experiment confirms, at all events, the opinion stated above; the beginning is made, and I may now pass from experiment to scientific deductions.

Remarks by Dr. Buchner.—My friend, Dr. Winkler, in communicating the above paper, very agreeably surprised me by transmitting at the same time specimens of his preparations of propylamine, and that too in quantities varying from one to two drachms, for which I hereby beg to express to him publicly my best thanks. I received from him, namely:—

1. The rough product of distillation of herring-pickle.
2. The aqueous solution of the sulphate produced from it.

3. The pure crystallized and by spirit of wine precipitated sulphate of propylamine.

4. The concentrated solution of pure propylamine.

5. The aqueous solution of the sulphate prepared with No. 4.

Hitherto I have only experimented with the preparations No. 2, 4, and 5, in order to verify, and complete the statements of the above paper. All these solutions are quite colorless and clear, like water; they diffuse already at some distance a strong odor of herring; but the pure aqueous propylamine, when smelt at closely, has a pungent odor, very similar to that of liquid ammonia, which, however, at a distance assumes, as it has been said, the smell of herring. This odor is so peculiarly characteristic, that I do not doubt, that even in water-closets, in consequence of fermentation, propylamine is developed, particularly as woollen clothes easily acquire there the odor of herring. All the conditions at least necessary for the formation of propylamine, ammonia, and carbo-hydrogen, are to be found in water-closets. In a small close room its odor becomes insupportable, and affects strongly the head. Doctor Winkler had, therefore, good reasons to warn me against it. A young chemist, upon whose hand I dropped a very minute quantity of aqueous propylamine, for the purpose of ascertaining its taste, notwithstanding that he had been walking after that a considerable distance, and had been exposed to the air, smelt still, after some hours, so strongly of herring, that happening to enter a company, he was spoken to about it by several persons. I mention this merely as a caution. The taste of pure aqueous propylamine is pungently alkaline, and hardly distinguishable from that of caustic ammonia.

The chemical reactions of propylamine are well explained by Winkler. Turmeric paper turns brown with it, but being exposed to the air, in which propylamine quickly evaporates, it resumes again its primitive yellow color.

Sulphate of propylamine (No. 3) appears in small splendid white prisms; exposed to the air it evolves a distinct smell of herring, and has a pungent saline taste, like sulphate of ammonia; it is entirely neutral, and when moistened with water, it does not alter the color either of blue or red litmus-paper, or of turmeric-paper.

We have in solutions of silver and iodine, which are not pre-

cipitated by ammonia, very appropriate re-agents for distinguishing propylamine from ammonia. Propylamine, however, treated with sulphate of silver, gave me not a white, but a yellowish-brown precipitate; and this result suggested to me the idea, that formiate of propylamine might be present. This precipitate was easily and perfectly dissolved in caustic liquid ammonia. With an aqueous solution of iodine I acquired at one time, according to the quantitative proportion, a brown, and at another time a beautiful yellow precipitate, which dissolved in an excess of iodide of potassium. I usually employ an aqueous solution of iodine in iodide of potassium, instead of the tincture of iodine made with spirit of wine. The precipitate produced by iodide of potassium is, as I have just stated, either brown or yellow, provided that no excess of iodide of potassium be employed.—*London Pharm. Journal, July*, 1252, from *Buchner's Neus Repertorium*. Bd. 1.

RESULTS OF THE EXAMINATION OF SEVERAL PARCELS OF ALEPPO SCAMMONY.

By B. W. Bull, of New York.

Since the publication of an article upon Virgin Scammony in a previous number of this Journal, I have had an opportunity of examining four different varieties of scammony received from Constantinople, under the names, Aleppo Scammony, first; Aleppo Scammony, second; Tschangari Scammony, and Skilip Scammony.

No. 1. *Aleppo Scammony, first.* This occurs in large amorphous pieces weighing one or more pounds; is not covered with any calcareous powder. The fractured surface presents a dark greenish resinous appearance. The specific gravity will be found below. The caseous odor is not so decided in this specimen as in some of the other varieties, confirming, as will be seen from its composition, as adduced further on, the remark made in the article above alluded to, in regard to the insecurity of relying upon the odor as a means of judging of the quality of scammony.

No. 2. *Aleppo Scammony second.* Of this a sample of about one pound was received. This is in amorphous pieces; it differs from the previous specimen in its fracture which is non-resinous

and horny, it is of a much lighter color, and has a grayish tinge. The scammony odor is more decided. This variety receives the prefix *Aleppo* improperly, as it does not come from that locality, and is said to be made by pressing the root, though the quantity of insoluble organic matter which it contains, seems to indicate some other impurity, intentionally added.

No. 3. *Tschangari Scammony*, derives its name from the place of production. It appears to be a variety not found in market here. It resembles in fracture the last mentioned, and is, like that, in amorphous pieces. Its odor is more decided than that of any of the others.

No. 4. *Skilip Scammony*. This specimen appears to have undergone some deterioration, and evinces a disposition to mould. Some of the pieces are marked exteriorly, as if placed in a bag when soft, and dried in this way. It is destitute of the caseous odor, and has a mouldy smell. Fracture, non-resinous, and grayish, like the last mentioned varieties.

These three latter varieties are always to be obtained in Constantinople, we are informed, while the first quality Aleppo, is only produced in small quantity, and is soon out of market.

The difference in composition of the different varieties will be found annexed, the numbers referring to those given above. All of them indicate the presence of starch by the test with iodine.

	No. 1.	No. 2.	No. 3.	No. 4.
Specific gravity.	1.150	1.325	1.339	1.311
Resinous matter, water, and loss.	Per cent. 86.88	per cent. 55.42	per cent. 64.10	per cent. 34.00
Vegetable substance, insoluble in ether,	8.10	38.00	23.17	59.43
Inorganic matter,	5.02	6.58	12.73	6.57
	100.000	100.000	100.000	100.000

New York Jour. of Pharm. June, 1852.

ON SOME CONSTITUENTS OF SAFFRON (CROCUS SATIVUS).

By M. Quadrat.

The author prepared the coloring matter of saffron in the following manner:—The saffron was completely exhausted with ether, and then extracted with boiling water; the clear aqueous solution was precipitated with basic acetate of lead, the red precipitate which forms washed with water, suspended in water, and decomposed by sulphuretted hydrogen, and the precipitate well washed. The coloring matter was then extracted from the precipitate with boiling alcohol, the alcoholic solution evaporated to dryness in the water-bath, the residue treated with water, and the aqueous solution evaporated to dryness. The coloring substance thus obtained forms an aurora-red inodorous powder, which dissolves in water with a yellow color; the presence of a trace of alkali increases its solubility in a high degree. It dissolves readily in alcohol, but sparingly in ether. It is decomposed by strong mineral acids; from an aqueous or alkaline solution it is separated by dilute mineral acids in brownish-red flakes, but in an altered state; the organic acids, as tartaric, tannic and gallic acids, likewise cause the separation of red flakes. Dilute solutions of the alkalies readily dissolve the pigment, and acquire a yellow color. Concentrated solutions, at the temperature of boiling water, decompose the pigment; and on distillation, an oily substance passes over, which has a different odor from oil of saffron, is lighter than water, but after some time sinks to the bottom as a brownish mass. On heating the pure coloring substance to 248° F., it turns blackish-brown; at 302°, it becomes shining red; at 356°, red-brown, with tumescence; and above 392°. it is entirely decomposed.

This coloring matter contains no nitrogen. Dried at 212°, it furnished on analysis results leading to the formula $C^{20}H^{13}O^{11}$, viz.

	Found.	Calculated.
Carbon, - - - -	54·54	54·34
Hydrogen, - - -	5·96	5·88
Oxygen, - - -	39·50	39·82

A red compound with oxide of lead, formed by precipitating the aqueous solution with basic acetate of lead, furnished, when dried at 212°,—



Carbon, - - -	21·81	20 =	21·55
Hydrogen, - - -	2·31	13	2·33
Oxygen, - - -	15·92	11	15·80
Oxide of lead, - -	59·96	3	60·32

The aqueous solution of the coloring matter gives with salts of copper a green, with lime or barytic water a yellow precipitate.

Saffron likewise contains a volatile oil, to which it owes its peculiar odor. On distillation with water, a yellow oil passes over, which is specifically lighter than water, has an agreeable smell, but after a short time forms a whitish mass, which sinks to the bottom.

On evaporating an ethereal tincture of saffron, a yellowish fatty substance is left behind, which on treatment with hot water yields on cooling a snow-white mass, the melting-point of which is situated at about 118°. It dissolves in boiling alcohol, from which it crystallizes in part on cooling.

Saffron also contains grape-sugar and an apparently new acid. On being burnt, it furnished 8·93 per cent. of an alkaline ash, which contained carbonic acid, sulphuric acid, silica, phosphoric acid, chlorides, lime, magnesia, potash and soda.—*Chem. Gaz. from Liebig's Annalen.*

ON THE OIL OF GRAIN SPIRIT, OR FUSEL OIL.

By Edward N. Kent.

The oil of grain spirit has recently attracted considerable attention from the fact of its being the basis of a number of artificial perfumes or essences, one of which has been extensively used under the name of banana or pear essence.

The crude oil, as is well known, consists principally of hydrated oxide of amyl, mixed with more or less acohol, and small quantities of other substances, the nature of which is not generally known, though it has been asserted that œnanthic ether and œnanthic acid may be found among them. To obtain the latter articles was a desired object, and that which led to the subject of this paper.

Crude fusel oil, (or the oil of grain spirit) when distilled in a glass retort, commences to pass over about 190° Fahrenheit, and considerable portion is obtained below 212; which consists mostly of alcohol and water, with a small quantity of the hydrated oxide of amyl. By changing the receiver and continuing the operation to about 280°, a large product is obtained, consisting principally of hydrated oxide of amyl, but contaminated with a little alcohol and water, and a trace of less volatile oil, which may be found in larger quantity in the residue remaining in the retort. This residue is small, of an ageeable odor, and consists of several substances among which may be found, an oil having the intoxicating smell, but not the chemical properties of œnanthic ether, other than a similarity in its boiling point.

To obtain a more perfect separation of the substances contained in the crude oil, a small copper still was constructed, on the principle which is now so successfully used in the manufacture of high proof alcohol, and which proved highly useful for the above purpose. This still is so arranged, that the vapor which is evolved by the boiling liquid, passes through a series of bent tubes, each of which is connected with a return pipe for returning vapors less volatile than boiling water, back to the still. These tubes are enclosed in a copper funnel filled with cold water, which becomes heated as the operation proceeds, and finally boils; the less volatile vapors are thus prevented from passing over, and the alcohol and water are almost perfectly separated from the oil remaining in the still. If the water is then drawn off from the vessel containing the serpentine tube, the distillation may be continued till it ceases spontaneously.

The product thus obtained, when rectified from a little dry caustic potash to remove coloring matter and acetic and valerianic acid, and again rectified from dry quick lime to remove water, gives pure hydrated oxide of amyl.

The residue left in the copper still is most easily obtained by distillation with water, containing a little carbonate of soda to neutralize free the acids contained in it. A small quantity of a yellow oil is thus obtained, having an agreeable vinous odor similar to œnanthic, but unlike that ether it yields fusel oil, instead of alcohol, when distilled repeatedly from caustic potash. It is

consequently an *amyl* compound, while œnanthic ether is known to be the œnanthate of oxide of *ethyle*.

The residue remaining in the still after the above distillation with water, consists of acetic and valerianic acids in combination with the soda, and the solution holds in suspension a considerable quantity of hydrated oxide of iron, which formerly existed in combination with the acids.

From the above statement it appears that crude fusel oil contains the following substances, viz:—

Alcohol,
Water,
Hydrated oxide of amyl,
Acetic acid,
Valerianic acid,
Oxide of iron.

And an amyl compound, analogous to œnanthic ether.—*New York Journal of Pharmacy, December* 1852.

ON THE SULPHURIZATION OF CAOUTCHOUC, AND ON SOME PROPERTIES OF SULPHUR.

By M. Payen.

The discovery in 1843 of the remarkable properties which are communicated to caoutchouc by a peculiar kind of sulphurization, called *vulcanization*, is generally attributed to Mr. Hancock.* It is only from this period that the applications of this elastic substance have become of considerable importance, and have given birth to several new branches of industry. In fact, since then the alterations produced upon the immediate principle, either by an elevation or decrease of the atmospheric temperature, have had no influence upon the vulcanized product. It preserves its suppleness and its elasticity below 32° F., and no longer becomes soft or adhesive above 95° and 104°; its temperature may even be raised beyond 212° without loss of that

*Incorrectly, we believe; the discovery is really due to Mr. Chas. Goodyear, of New York, U. S.—W. F.

tenacity which renders it so useful for certain purposes, for instance, for transmitting steam and the mechanical force by flexible tubes.

The principal conditions of success in this manufacturing operation had been carefully determined; in England, America and France, several methods had been successively imagined, which realized more or less perfectly the curious and important modifications of the sulphated substance; but it was not known in what the chemical reaction consisted; no one had an accurate idea of what is termed *desulphuration*. Lastly, it was impossible to understand, and consequently to prevent, certain alterations, especially the rigidity and fragility of several objects, after having served often but a short time the purposes for which they were made.

The investigations which I have the honor to bring before the Academy have had for their object to throw some light on these points of applied science. I shall first describe what takes place in one of the processes of vulcanization still employed by several manufacturers; it will then be more easy for me to point out the effects of other processes. If a strip of caoutchouc from two to three millims. thick is kept immersed for two or three hours in melted sulphur, at the temperature of 234–240°, the liquid will penetrate into the pores like water or alcohol, as we have already shown, but still more quickly, and the weight of the strip will have increased by 10- to 15-hundredths. The organic matter will have experienced no considerable modification in its properties; it can be shaped, and its recent sections joined, just as in the normal state; solvents will act upon it with the same force; but its porosity will be diminished. If the temperature be now raised to 275°, 302° or 320°, in any medium whatever, inert of itself, a few minutes suffice to effect the change. By prolonging the action of the temperature, the object in view would be exceeded, the product, gradually less supple and less elastic, would soon become hard and fragile. This last alteration would be still more marked if the caoutchouc were kept at the above temperatures, 275°–320°, in melted sulphur. The amount absorbed would gradually increase until it became in twenty-four hours, for instance, nearly equal to the

weight of the organic matter, or forming 48 per cent. of the stable compound.

From the commencement of the reaction of the sulphur at this temperature, and during the whole of the time it is continued, a slight but constant disengagement of sulphuretted hydrogen takes place.* Even the liquid sulphur at 302° absorbs, and is capable of retaining a volume of this gas nearly equal to its own. A curious phenomenon results from this fact; at the moment when the sulphur crystallizes, from the decrease of temperature, each crystalline particle liberates a bubble of gas; sometimes this is disengaged; sometimes, meeting with the crystals, it raises them and remains interposed, so that gradually the whole mass rises, and increases from 15 to 20 per cent. of its primitive bulk, instead of diminishing, as would happen in a normal crystallization of pure sulphur.

Instead of causing the liquid sulphur to penetrate at a temperature near its melting-point, the caoutchouc may be mixed by a mechanical roller with from 12 to 20 per cent. of its weight of sulphur in a state of fine powder; the properties of the organic matter are not altered, but can be modelled and joined together as in the normal state. But if the temperature is now raised to the point at which the vulcanization is effected, it takes place as in the first case; the suitable term would be equally exceeded under the same circumstances, and the alterations above mentioned would be likewise manifested.

Composition and Properties of the Caoutchouc vulcanized by the Methods above described.—When the suitable term has not been exceeded, the organic substance contains sulphur in two different states; from 1 to 2 per cent. is held in intimate combination;† the remainder is simply interposed in its pores.

*At the same time an equivalent quantity of an organic substance separates, which contains more carbon than the caoutchouc, and which can be extracted with a hot solution of caustic potash or soda, which does not act perceptibly upon the mass of the caoutchouc combined with the sulphur.

† This compound has not altered the relations between the elements of the organic substance which is represented by the formula $C^8 H^7$, as I have proved by several analyses made upon normal caoutchouc, or one of its two unequally soluble parts, and also on the compounds containing from 0·015 to 0·485 sulphur.

The uncombined excess of sulphur is gradually eliminated from the caoutchouc by the mechanical effect of the extension and contraction of the pores; this continues for several months. Several chemical reagents remove the interposed sulphur more rapidly and more completely, as hot solutions of caustic potash and soda (and even cold in the course of a month if renewed frequently), sulphuret of carbon, essential oil of turpentine, benzine, and anhydrous ether. These liquids cause the organic matter to swell to such an extent, that its bulk is soon increased eight or nine times.

Ether removes the sulphur in a peculiar manner. A small proportion is first dissolved, which is then carried to the exterior; there it separates in crystalline particles; other particles, successively dissolved in the interior, follow the same course, and increase the size of the crystals, which soon become pretty large, and are of the octahedral form. Neither turpentine nor benzine transfer the crystalline particles of the sulphur removed from the interior of the swollen mass to the exterior. This peculiarity appeared to me to be owing to the hitherto unobserved greater solvent power of the turpentine and benzine; in order to verify this fact, I saturated these two liquids, kept at a constant temperature of 167° F., in the water-bath with an excess of flowers of sulphur. The yellow solutions were immediately filtered, when they deposited crystals on cooling :—

	In turpentine.	In benzine.
The hot solutions contained	0·0587	0·0733 sulphur.
After cooling they contained	0·0135	0·0173 sulphur.

Moreover, the crystals were not similar; the turpentine, on slow cooling, as also on evaporation at 77°, had deposited the sulphur in small octahedrons; on sudden cooling, it deposited it in acicular prisms; in the benzine the crystals were prismatic. It is curious to observe this last mode of crystallization in a test-tube; a number of diaphanous rectangular plates are seen to form, ascend and descend rapidly in the liquid, and successively agglomerate at the bottom of the vessel in laminæ, which thus gradually lengthen; if, after cooling to 59°–60°, evaporation is allowed to recommence, a further crystallization takes place now in diaphanous octahedra, which attach themselves to the extremities of the opake yellowish lamellar prisms first formed. On evaporation with heat, long silky laminæ are obtained. A drop of the same solution in

benzine, placed on the object-bearer of the microscope, deposits on evaporation transparent octahedra.

100 parts of hot sulphuret of carbon dissolve	73·46 sulphur.
100 parts of cold sulphuret of carbon dissolve	38·70 sulphur.
100 parts of hot ether dissolve - -	0·54 sulphur.
100 parts of cold ether dissolve - -	0·188 sulphur.

On cooling, the sulphur crystallizes in large octahedra from sulphuret of carbon; from ether, in minute octahedra and some prisms.

Ether and sulphuret of carbon, kept for a long time in contact with vulcanized india-rubber, retain from 4 to 5 per cent. in solution, which may be isolated by evaporating several times, and each time removing by ether the free sulphur, and then treating with anhydrous alcohol, which removes from 1 to 1·50 per cent. of fatty matter. The caoutchouc thus extracted may be separated into two portions, one very ductile, which dissolves in benzine, and is deposited on evaporation; the other more tenacious, less extensible and insoluble. Both these portions come from the interior of the strips at a certain depth, where the combination is less intimate, and contains less sulphur than near the surface.

The want of homogeneity in the combination of the sulphur with the organic substance is greater in the two other methods of vulcanization, which I shall describe further on.

After vulcanization, the caoutchouc still consists of two parts, differing in cohesive power and solubility. This may be proved by keeping it immersed for two months in a mixture of 10 parts sulphuret of carbon and 1 of absolute alcohol. The dissolved portion consists of the interposed sulphur, which is removed after desiccation by a solution of caustic soda; the organic substance the least aggregated is then left as a translucid, yellowish, slightly-resisting mass. The undissolved portion is become more brown and less transparent. The following are the proportions obtained in the experiment, besides the fatty matter:—

Insoluble tenacious portion - -	65
Soluble soft portion - - -	25
Excess of sulphur - - -	10

Vulcanized objects, applied on metals, especially upon silver,

gold, copper, lead and iron, act by their interposed sulphur; they sulphurize more or less rapidly the metallic surfaces in contact with them. The washers placed between the flanges of tubes used for transmitting steam under a pressure of 4 or 5 atmospheres, which are exposed consequently to a temperature of 293°–308°, soon lose their elasticity and become hard and brittle, owing to the combination which takes place between the free sulphur and the caoutchouc. This is greatly avoided by desulphuration with caustic alkaline solutions, or by the use of a new method of vulcanizing, described at the end of this paper.

Some comparative experiments made with, 1st, *normal*, 2d, *vulcanized*, 3d, *desulphurated* caoutchouc, show that, on immersion for two months under similar circumstances, the absorption of pure water was for the first 0·200–0·260, for the second 0·042, and for the third 0·064. Some balloons, 2 millims. in thickness, filled with water, and submitted to a pressure which doubled their diameter, lost by continual transpiration in twenty-four hours, and per square metre, the normal caoutchouc 23 grms., the vulcanized 4 grms.

Similar balloons, filled with air under the same pressure, experienced scarcely any loss in eight days. The perceptible loss of water through a thin layer of caoutchouc will be readily understood; the liquid introducing itself by capillary attraction into the pores of the organic substance, and replacing in a continuous manner the quantities which evaporate at the external surfaces. That the air and gases in general do not behave in a similar manner needs no explanation.

The process of cold vulcanizing invented by M. Parkes consists in plunging the sheets or tubes of caoutchouc into a mixture of 100 parts sulphuret of carbon and 2·5 parts protochloride of sulphur; the liquid, penetrating into the organic substance, causes it to swell, and deposit sulphur, which unites with the caoutchouc, owing to the decomposition of the unstable compound which it formed with the chlorine. The superficial parts would be too strongly vulcanized, and would become brittle, if care were not taken to remove the objects after a minute or two, and to immerse them immediately in water, as recommended by M. Gérard. The chloride of sulphur is decomposed by its contact with water, while the portions which have penetrated further continue their sulphur-

izing action in the interior. This is an ingenious plan of regulating this kind of cold vulcanization.

Another process which appears preferable on account of the salubrity and regularity of the operation, is due to the same inventor; it consists of immersing in a closed vessel for three hours the objects to be vulcanized, in a solution of polysulphuret of potassium indicating 25° Beaumé, at a temperature of 284°, and then washing in an alkaline solution, and afterwards in pure water. In this manner the useful amount of sulphur is combined with the caoutchouc without an excess being left in its pores; and we thus avoid the inconveniences which result from the unequal sulphurization of the organic substance.—*London Chem. Gaz.*, May 15, 1852. from *Comptes Rendus*, March 29, 1852.

ON OXIDE OF ZINC.

By Dr. Wittstein.

Mohr (*Archiv der Pharmacie*, lxv., 127) has found that a full red heat is not essential for the complete separation of carbonic acid and water from the carbonate of zinc, but that a temperature of from 280° to 300° C. (= 536° to 572° Fahr.) suffices for their speedy and perfect expulsion. The operation can be performed in an uncoated glass alembic or porcelain dish. The preparation undergoes no change of color thereby (*i. e.*, it remains perfectly white, whereas, the over-heated oxide shows a trace of yellow.) We now observe that it has become very mobile, and no longer adheres to the capsule, but floats on a layer of carbonic acid and aqueous vapor.

If a glass flask be used, it must be half filled with finely pulverized* carbonate of zinc, and placed on a triangle not too near a gentle coal fire. As soon as condensation of watery vapor takes place in the neck of the flask, this is to be stopped with a piece of cloth, and gently shaken in a circular direction. Thereby those parts at the lower surface of the flask are mixed with the rest of

* This condition is essential to the success of the operation.

the powder, and other portions are transferred to the fundus of the flask, while the aqueous vapor is more quickly and abundantly disengaged and deposited on the neck. In order to remove this the more readily, a pair of small hand-bellows may be employed for the purpose of gently blowing into the neck of the flask. After repeated shaking the process is terminated. Its completion may be known by the circumstance of the powder no longer floating, as it were, on the surface of the stratum of vapor, but subsiding to the bottom of the vessel. A proof of the absence of carbonic acid may be found by placing the powder in a porcelain dish, and repeating the operation with a fresh quantity.*

The experiment and testing are more easily performed in a porcelain dish, as the shaking can therein be more exactly regulated. If the temperature be raised too high, the powder will be burnt yellow even under a red heat. This observation of the yellow discoloration from a pure white by irregularity of the heat, has led Dr. Wittstein to the consideration of the question, often discussed, of the cause of the yellow color of oxide of zinc prepared in the moist way. For this purpose he has instituted a series of experiments, and has shown, among other conclusions, that the adhering sulphate or alkali exerts an essential influence, although at present the question cannot be fully answered.

Under these circumstances a theory is advanced by the author which may be considered as not entirely absurd. We know that the estimate of the color of a body is different according as it is in a state of minute division, or in that of a compact solid form. Thus brown iron ore gives a dirty yellow powder; and a brownish piece of gum Arabic will produce a perfectly white powder; and so forth. It is extremely seldom that the reverse is noticed, viz., that the powder is darker than the mass; such is the case with the colorless diamond, which gives an ash-grey powder. The author is of opinion that the change of white oxide of zinc to that of a yellowish white, from increase of temperature, may probably be owing to a change in the state of its molecules, somewhat resembling that of incipient fusion; and he hoped to have been able to have determined this point by the help of the microscope.

* In the same manner, Mohr converts carbonate of magnesia into pure magnesia.

With this view a portion of carbonate of zinc, which had been ascertained by the usual tests to be free from any trace of iron or other metallic impurity, was placed in a porcelain dish over a spirit-lamp, and constantly stirred until it became so hot that a test-portion added to dilute sulphuric acid gave off no bubbles of gas—a point which speedily occurs. This preparation had the same snow-white color as the pure carbonate. Placed under a microscope, having a magnifying power of one hundred and twenty, the separate particles of the powder were easily observed; under this power they appeared as globules of about the size of pins' heads, frequently smaller, seldom larger, never exceeding 1-140th of a line in diameter: their form was changed by moisture. The parts that were moistened were distinguished from the surrounding powder by a distinct pale yellow color.

The oxide was now heated for a quarter of an hour; when quite cold it was no longer of snowy white but milk white; the difference could readily be appreciated by a comparison with the pure oxide. Magnified a hundred and twenty times, the particles appeared opaque, smaller than before, and often arranged in a string-like form. There were also observable numerous yellowish-brown particles dispersed among the yellowish-white mass. When magnified three hundred times the globules were transparent—the oxide remained the same after it had been heated half an hour, one hour, and two hours. Between a quarter of an hour and two hours the oxide undergoes absolutely no change, neither to the naked nor to the assisted eye.

The author considers that he has thus made an approach towards the solution of this riddle, although the above theory should not be confirmed or should even be controverted. There can be no doubt that the yellow discoloration retained by the oxide after cooling is owing to the yellowish-brown particles scattered throughout the mass. It still remains to discover the nature of these granules in order to answer this long-debated question of the cause of the yellow color of the oxide of zinc prepared by heat.

It has been above observed that the carbonate of zinc operated upon had been found pure by the usual reagents. By testing, it was examined for iron, lead, cadmium, and copper; the acidulated solution of the hydrochlorate with sulphocyanuret of potassium,

and hydrosulphuric acid, were added without producing any result. Possibly manganese might be present, which, in only slight traces, it is well known, is not easily detected. In the burnt oxide, manganese must be present in the state of oxyduloxide: if, therefore, this be converted into a muriate, chlorine must be present, and this will exert a solvent action on gold-leaf simultaneously exposed to its influence; faint traces of gold in solution may be indicated by chloride of tin, and the author trusts that in the cases of the presence of manganese that he may obtain a decisive reaction. At first the muriatic acid employed, with a possible admixture of free chlorine, was tested by digestion with gold-leaf, but with negative results. In the next place, one loth (equal to half an ounce) of the burnt oxide of zinc was dissolved in the same hydrochloric acid which contained gold; and the vessel being closed by a glass stopper was set on one side for twenty-four hours. Chloride of tin produced no change in the solution, even after several hours' exposure to the action of warmth. Dr. Wittstein employed also a very sensitive test for manganese, first proposed by Crum, and which he has himself frequently found useful, viz. a solution of the oxide in nitric acid, to which is added a small quantity of the brown binoxide of lead, heat being applied; manganese being present, hypermanganic acid is formed, and the fluid becomes reddened. By this test, however, no manganese was discovered, and the author therefore concluded that the oxide of zinc was free also from this impurity.

Dr. Wittstein repeated his experiments for the detection of other metals, upon larger quantities of the oxide, as in his earlier researches. Half an ounce was dissolved in excess of hydrochloric acid, and hydrosulphuric acid passed through the solution for a long time—it produced not the slightest disturbance. Again, half an ounce of the oxide was dissolved in hydrochloric acid, which had not shown any change on the addition of sulphocyanuret of potassium, and on the then employment of this reagent, a faint red discoloration showed the presence of slight traces of iron. The extraneous admixture, which was shown to be present by the aid of the microscope, consists also of oxide of iron, but in such minute quantity, that of all its tests the sulphocyanuret of potassium alone manifested its presence.

From all the preceding, the author considers it fair to infer, that when the oxide of zinc, after being heated, acquires a yellowish tint, it proceeds from the presence of a slight trace of oxide of iron. Clearly, however, no explanation is hereby furnished of the cause of the citron-yellow color of oxide of zinc which attends its heated condition and disappears on cooling. This phenomenon is purely physical, and must be classed with numerous similar phenomena, *e. g.*, the blackening of oxide of mercury by heat, and so forth.—*Pharm. Jour.* 1852, *from Vierteljahresschrift für praktische Pharmacie*, 1852.

Varieties.

General Report upon the Results and Effects of the "Drug Law," made to the Secretary of the Treasury. By C. B. Guthrie, M. D.—The act of Congress, approved 26th of June, 1848, entitled "an Act to prevent the importation of spurious and adulterated drugs and medicines," having now been in existence and enforcement almost three years, the working of the law, and its effects, immediate and remote, have become necessarily matters of fact, and are no longer left to conjecture and speculation.

At the time of the passage of this law by Congress, no inconsiderable fears were entertained by its friends, and great hopes by its enemies, that it would be found impracticable to carry out its requisite provisions without great injury to that portion of our citizens engaged in the importation of this class of merchandize, in which event its repeal would, of course, have been urgently solicited.*

In entering upon the duties of the commission, which I had the honor to receive from the department, I was fully impressed with the importance of the information sought for, and the necessity of a candid, impartial and unbiassed examination of facts bearing upon the subject, and in making to the department this report, I have divided my results and facts into immediate and remote; the reasons for which will appear in the detail. Under the general terms drugs and medicines, are embraced all articles intended for the treatment of the diseases of the human system, and though they admit of many subdivisions, these terms, included under the two heads

*Strong *prima facie* evidence of the popularity of this law may be found in this significant fact that not a petition for its repeal has ever been presented to Congress.

of chemicals and compounds, and crude drugs, are all that is necessary for my purpose in speaking of the effects and applications of the law.

First, with regard to the effect upon chemicals and compound medicines: Previous to the passage of this law, no restriction was laid upon any class of medicines coming in under this head. If the importer paid the requisite duty, no questions were asked, no limit was fixed as to quality or condition. It needs no argument, but merely a mention of the fact, to show that any compound medicine or chemical preparation may be so made as to deceive the unsuspecting and uneducated, and even very often the druggist, apothecary, physician and all, because they were not in the habit of analysing their articles, and were deceived by their external, often times very fine appearance. Under the combined influence of competition and avarice—two strong temptations—the manufacture of articles of this class had become systematised, and on purpose to supply the United States market.

The immediate and positive beneficial results of the law may be seen in the fact that now very few, if indeed any, spurious or sophisticated chemical preparations, for pharmaceutical purposes, are even offered at our ports, or by any possibility find their way into our markets. Manufacturing chemists and importers of this description of medicines, finding it impossible to get such goods through our custom houses, will, of course, not risk the loss of bringing them here, but in their stead will import such as are known to come up to our required standards. Under this general head of chemicals, may be included a large majority of the manufactured and compound medicines used in practice by the medical faculty, and all the most important usually purchased by others for domestic uses, more especially in the west and south, where every man, almost, is obliged to learn the uses and doses of calomel, blue mass and quinine, &c. The certainty of purity in these articles alone, is a matter of no small moment to the community at large; of the probabilities of their home adulteration I shall also refer to elsewhere.

A few articles of this class may now and then, either through culpable negligence on the part of the inspector, or by being entered under a false name, be imported, but they must be few, and are daily growing less. An instance of this kind has occurred in New York, where a large lot of sulphate of lime was offered in market, under the name of precipitated chalk. The New York College of Pharmacy, standing very properly as the guardians of the public health, and protectors of this act, for which they had petitioned and which they had agreed to support, by committee, reported the fact, and warned the holders of the consequences of continuing to sell the article as a medicinal preparation, upon which they very readily withdrew it. How it came into the city that committee have never been able to ascertain; whether imported under the head of plaster of Paris, and thus escaping the eye of the inspector, or whether passed by him, or at some other port, without due test and examination, I am not able to say. That it was imported under a false name is to my mind the most likely of all.

If our Colleges of Pharmacy in the different cities, as I have no doubt they will, continue to thus watch the articles offered them and the public, and act with the independence that has characterised them thus far, no deception of this kind will go long unexposed, and it will soon cease altogether.

No manufactured article, susceptible of adulteration, ought ever to be suffered to pass by the Examiner of drugs without being *sampled* and tested by analysis, and no matter what its appearances or what its label; neither the one nor the other are guarantees of its purity, for both may alike be counterfeits. The more popular the maker, the higher his name and reputation, the more likely his name, label, bottle and article to be counterfeited, as has Pelletier's name to the article quinine, others to iodide of potassium, &c. &c.

Secondly. The effects of the law upon crude drugs and medicines, such as leaves, barks, roots, gums, gum resins, &c. Upon these articles the effect has been the same as upon chemicals and compound goods. Greater variations must of course occur in their qualities, as many of them cannot be tested with accuracy; and of the rest, very imperfect standards are to be found in any of the works on pharmacy or materia medica now extant. This was heretofore left entirely in the hands of the examiner at each port, who has been obliged to fix his own standards when there were none laid down in the works referred to in the instructions of the department. Such has been the case with many of our most valuable and important articles of crude drugs, gums, and gum resins,—such as opium, scammony, &c. Such also has been the case with many of the roots and barks, as rhubarb and cinchona and all its varieties. One may have fixed upon five per cent. of morphine, and another upon eight, another ten, as the standard for opium. Again, the same might occur in admitting or rejecting scammony. One requiring sixty or seventy per cent. of resin, another admitting or rejecting, merely from the physical appearance of the article.

So again with regard to barks, especially the cinchonas—one refusing to admit any except the true medicinal article; another admitting Maracaibo and other false barks usually sold in market as pale bark, or used to adulterate that article. But, upon the whole class of crude drugs, the effect has been highly beneficial. Greater care is taken in their selection and preparation for market, and a vast quantity of many kinds of barks and roots heretofore finding daily their way into market, either in their simple worthlessness or mixed with purer and different articles, are now scarcely, if ever found; and if seen they are about the last of their kind. Now and then, an article may get through our ports, by some adroit means of deception, or be slipped in at a port where there is no examiner, but this must be but seldom. But recently, in New York, I saw several casks of gum guaiac, the heads of which, for about six inches, were filled with a fair article, while the remaining portion of the cask was made up of the vilest trash imaginable. This is but a shallow trick that could not be often repeated, for though

it might deceive the examiner (as it did not) it would meet detection in the hands of the jobber, who would not fail to claim damages from the importer at once. Another mode of evading the law, is by sending sample packages to the examining office, or such cases as are known to be all right, and getting the whole invoice passed by them. This can only be guarded against by the examiner being always upon the alert, and where there is the least doubt, refusing to pass anything except what he sees and knows to be correct as to quality. The facility with which this fraud may be practised, led the convention of the Colleges of Pharmacy to recommend that every package should be examined; an opinion, I then and now fully concur in. Many similar instances, both in regard to chemicals, chemical preparations and all sorts of crude drugs, might be given, but they have no bearing upon the object of this report, only as they point to a necessity for the law's continuance.

Another immediate result of the law is the exclusion of damaged drugs. Heretofore no state of damage or decay, whether little or much, prevented an article, either manufactured or crude, being thrown into market and sold for whatever it purported to be, whether calomel half oxydyzed, iodide of potassium one-third deliquesced, rhubarb one-half rotten, senna in a similar or worse condition from being soaked with salt water—they were each sold under their original names, and found their way into the hands of the buyers of *cheap goods*, either in that state or powdered or re-bottled, re-labelled, and done up good as new. The importer got his drawback of twenty-five, fifty, and seventy per cent. of duty. The insurance company sold the goods and paid the difference; bargain getters purchased; the physician prescribed; the apothecary dealt out, and the patient, suffering under the pains and ills of lingering disease, swallowed; all but the last got their pay, while the poor man who bore the unrighteous accumulation of the whole, cursed his physician for not understanding his complaint, and perchance turned his face to the wall and died. This is no fancy sketch, but true, every word of it, and more than once acted out in the drama of every-day life.

Under the proper construction and administration of the law, all this will and is now mostly prevented. It must be evident that any article of medicine essentially damaged, is not fit to be given to the sick as a remedy. This is a very important point, and all examiners should be careful to enforce it strictly, regardless of the specious plea of interested insurance companies or individuals, for any other construction for their general or especial benefit or relief.

In few words then, may be summed up the immediate effects of this law: A purer and better class of chemicals and compound preparations, a material improvement in the quality of crude drugs imported, such as gums, barks, roots, leaves, and an almost entire exclusion of damaged and decayed drugs from our markets.

These results are, in themselves, sufficient to mark the law as one of great value, and to entitle it to a sure claim for perpetuity, and its provisions to

a steady enforcement. But they are by no means all that it has accomplished. Its remote or secondary effects, which I propose to point out, are equally important, and they are found in the influence upon our home manufactures and trade.

It has often been claimed that the law was a tariff for protection to home adulteration, and while we shut out the evil in one way, we were equally exposed to it in the shape of home preparations; were this even true, it is no argument against the law for keeping out foreign adulteration, as it is very evident that if both are equally bad, no pure medicine can be had by those who require them, while if we are certain the foreign are pure, we have a choice between the pure and the sophisticated. But I am satisfied that the amount of home adulterations have been over estimated, and that under the effect of this law they are decreasing daily, and perhaps mainly because the demand is decreasing.

I have never believed, though it has been again and again asserted, that our medical gentlemen to any great extent, who buy and use most largely of this class of goods, have desired to buy and use inferior medicines, because they were cheap, and my own direct intercourse and observation, as a druggist for five years, aside from a six years' experience in the profession, has satisfied me of the correctness of my views. I speak of the country at large. Wherever it has been the case, it has been the result of ignorance, as to the appearance and physical properties of drugs that has led them into this error, an error in which, from a like ignorance, they have been kept by their druggist, who has been imposed upon by the bland assurance of the importer or jobber, which led him to take all things of a like name as of the same quality. There are those who buy because cheap, and prescribe, and perchance hope for success in the use of such remedies, but they are not found among our medical gentlemen of education and character and entitled to the respect and confidence of the community at large. The flood of light thrown upon this subject of adulterations of medicines by the reports to Congress; by the report of Dr. Bailey, special examiner for the port of New York; reports to the American Medical Association, and by various other writers in our pharmaceutical and medical journals, through the newspapers of the day, and various other means, to the people, has worked and is working a revolution in the drug trade at large. By a desire and growing necessity for a proper education of pharmaceutists and druggists, a man is no longer considered competent to sell, dispose and deal out medicinal articles affecting the health, life and happiness of his fellow-beings, simply because he can calculate a per centage, or make a profit.

The reform in this department is, I know, but just beginning, though long needed, but it will progress, for public opinion demands, and will continue to demand it.

Physicians, professors of materia medica, and teachers of practical pharmacy and chemistry are feeling it, and the whole course of teaching upon this and kindred branches, has received more attention from both professor

and pupil within the two past years, than ever before in the same length of time in the United States. From these combined sources will continue to flow a light that must shine upon and enlighten that ignorance which was permitting men to tamper with the life and health of the community. This has also had the effect to create a demand for pure medicines. Rhubarb is no longer rhubarb unless the quality is such as to commend it to the unfortunate consumer; and calling a thing by a good name is no longer sufficient to redeem it from its lack of curative properties and consequent worthlessness.

Again, the endeavor to come up to the law's standard for chemicals, the competition with the imported article, the increasing demand for good medicines, together with a commendable emulation among our chemists, has produced an improvement in this class of goods, sufficiently visible to refute all charges of home adulteration because protected from foreign competition; besides this, they are our fellow citizens, within reach of our complaints, with no intermediate dealer to shift the blame of impurity to the other side of the ocean, and thus wash his innocent hands at our cost. With this and the spirit of inquiry as to what we are selling, what we are buying, what we are administering, what we are swallowing with hopes of relief, that is abroad, no man can long escape detection, exposure and consequent loss of business, if engaged in the manufacture or sale of spurious goods.

These opinions are the result of the concurrent testimony of the different examiners, of various dealers in drugs throughout the country, from whom I had before and since my appointment to this commission been in receipt of information, and are fully borne out by my own extensive observation in almost every State in the Union.

Without inquiring or pointing out the cause, the testimony to this effect, that the quality of drugs in general has improved much within the two past years, is almost universal; and a style of drugs and chemicals, and of medicinal preparations, may now be found on sale in our great commercial emporiums, of a quality and purity never before found, certainly not in the United States, and I question if anywhere else.

These are the results of my observations, both as to the remote and immediate, or special and general effects of the law. And I feel that the friends of the law have great reason to congratulate themselves and the community at large, upon the fullest realization of their hopes as to the good accruing from these sanitary measures.

Those who were reaping an iniquitous harvest either through a desire to do evil for the purposes of gain (if any such there could have been,) or through ignorance of the extent of such evil, must themselves feel that the law has worked no wrong to them even though it may have forced them into a different channel of trade. The only ones from whom we shall hear any complaints while the law is carefully and judiciously executed, or

from whom we shall hear the plea for "unrestricted commerce," and the potency of the great laws of trade as in themselves sufficient for the protection of life and health, are those whose prototypes aforetime cried out "Great is Diana of the Ephesians."

The value of their opinions may be measured by the sincerity of their professions, and the weight of their testimony calculated by the percentage of their gains.

I have pursued my inquiries among drug importers and jobbers, meeting both friends and enemies of the law; among retail apothecaries, professional men and their patients, and my conclusions are that no more popular act stands upon our congressional record.

I have only to add my sincere wish that it may long stand as a mark of the enlightened wisdom of the age and nation.—*N. Y. Jour. Phar. Sept.* 1852.

[The above report is but the general report upon the working of the law. It was, we understand, accompanied by a second private and detailed one, regardiug the manner in which, at different localities, the law has been carried out.—EDITOR N. Y. JOUR. PHARM.]

On the Preparation of Anhydrous Acetic Acid. By M. CHARLES GERHARDT.—The author states that he has succeeded in preparing anhydrous acetic acid in a state of perfect purity, and giving by analysis numbers exactly agreeing with those calculated from its formula. It is obtained by mixing perfectly dry fused acetate of potash with about half its weight of chloride of benzoyle, and applying a gentle heat, when a limpid liquid distils over, which, after being rectified, has a constant boiling point of 279° F., is heavier than water, with which it does not mix until after it has been agitated with it for some time. It dissolves at once in hot water, forming hydrated acetic acid.—*London Chem. Gaz.*, June 5, 1852.

Estimation of the Quantities of Free Acids in the Juices of Fruit. By M-GRÆGER.—The juices under examination are mixed with neutral tartrate of potash, and the amount of free acids calculated from the quantity of bitartrate of potash which separates. To determine the amount of free tartaric acid in a juice, a second portion is divided into two equal parts; the one is neutralized with potash, and the other half of the juice now added, and the amount of acid calculated from the quantity of precipitated bitartrate of potash.—*London Chem. Gaz.*, from *Jahrb. für Prakt Pharm.*, xxiii. p. 293.

Mixtures for Colored Fires. By Prof. MARCHAND.—The following re cipes for the preparation of mixtures for colored fires were found among the posthumous papers of the late Prof. Marchand. The materials are ubbed to a fine powder separately, and then mixed with the hand:

Red.

61 p. c. chlorate of potash.
16 sulphur.
23 carbonate of strontia.

Purple-red.

61 p. c. chlorate of potash.
16 sulphur.
23 chalk.

Rose-red.

61 p. c. chlorate of potash.
16 sulphur.
23 chloride of calcium.

Orange-red.

92 p. c. chlorate of potash.
14 sulphur.
34 chalk.

Yellow.

61 p. c. chlorate of potash.
16 sulphur.
23 dry soda.

or,

50 p. c. nitre.
16 sulphur.
20 soda.
14 gunpowder.

or,

61 p. c. nitre.
17½ sulphur.
20 soda.
1½ charcoal.

Light Blue.

61 p. c. chlorate of potash.
16 sulphur.
23 strongly-calcined alum.

Dark Blue.

60 p. c. chlorate of potash.
16 sulphur.
22 carbonate of copper.
12 alum.

Dark Violet.

60 p. c. chlorate of potash.
16 sulphur.
12 carbonate of potash.
12 alum.

Pale Violet.

54 p. c. chlorate of potash.
14 sulphur.
16 carbonate of potash
16 alum.

Green.

73 p. c. chlorate of potash.
17 sulphur.
10 boracic acid.

Light Green.

60 p. c. chlorate of potash.
16 sulphur.
24 carbonate of baryta.

For Theatrical Illumination.

White.

64 p. c. nitre.
21 sulphur.
15 gunpowder.

or,

76 p. c. nitre.
22 sulphur.
2 charcoal.

Red.

56 p. c. nitrate of strontian.
24 sulphur.
20 chlorate of potash.

Green.

60 p. c. nitrate of baryta.
22 sulphur.
18 chlorate of potash.

Pink.

20 p. c. sulphur.
32 nitre.
27 chlorate of potash.
20 chalk.
1 charcoal.

Blue.

27 p. c. nitre.
28 chlorate of potash.
15 sulphur.
15 sulphate of potash.
15 ammonio-sulphate of copper.

The dark blue is rendered still darker by the addition of some sulphate of potash and ammonio-sulphate of copper.—*Chem. Gazette*, May, 1852, from *Journ. für Prakt. Chem.*, liv. p. 250.

New Method of Effecting Crystallization. By M. PAYEN.—Having observed the phenomena of the crystallization of sulphur on the surface of vulcanized India Rubber, in which case it appears to pass in solution from the interior of the mass and to be deposited there in consequence of the evaporation of the solvent, I was induced to seek the means of increasing the size and regularity of the crystals obtained from different substances, and especially those of little solubility.

I have attained this object by a simple arrangement of apparatus, through which a liquid circulates, which, in one part, dissolves the substance to be crystallized, and in another and cooler part deposits it in a crystalline state. The apparatus consists of a flask or tubulated receiver, surmounted by another vessel of a similar kind, the necks of which are connected, and the lateral openings of which communicate by tubes, the one with the top and the other with the bottom of a vessel placed at some distance. The inverted receivers are both filled with the substance to be dissolved, and the whole of the apparatus with the solvent. Heat derived from a constant and uniform source is applied to the receivers, by which a continued circulation of the liquid is maintained, and this being saturated in the most heated part of the apparatus, is conveyed to the cooler part where the deposition takes place.

Crystallization may thus be made to take place slowly and regularly, so as to produce crystals of considerable size, even from slightly soluble substances. By using benzole and sulphur, I have been enabled in this way to obtain crystals a hundred times larger than those formed in the usual way. *Pharm. Journ.*

On a new Saccharine Substance contained in the Berries of the Mountain Ash. By J. PELOUZE.—The berries of the mountain ash contain among other substances malic acid, bimalate of lime and glucose. The great acidity of this fruit does not admit of our supposing the existence in it of cane-sugar. The crushed berries yield a juice which soon begins to ferment, and furnishes a vinous liquid of a very acid, and by no means agreeable taste, which in some districts is used as a substitute for cider.

The experiments of Piria on the transformation of asparagine or malamide into succinate of ammonia, those of M. Dessaignes on the conversion of malic acid, or of malic acid combined with lime, into succinic acid, led me to suspect that the latter acid might be readily obtained by the action of the atmosphere upon the juice of the berries of the mountain ash. I was disappointed in my expectation; no succinic acid could be detected in some juice which had been exposed for more than a year, but I found it in a new kind of sugar, which I propose to call *sorbine*.

Preparations of Sorbine.—The berries collected towards the end of September were crushed and pressed in linen; the juice was exposed from thirteen to fourteen months in some dishes, during which time several de-

posits and mouldy vegetations formed in it, which were not examined. The liquid, which had spontaneously become clear, was decanted, evaporated at a gentle heat to the consistence of thick syrup. This syrup deposited some dark brown crystals, which were completely decolorized by being twice treated with animal charcoal.

Sorbine contains no water of crystallization; it can be fused without parting with any water. With chloride of sodium it forms a compound which appears to crystallize in cubes. Sorbine is colorless, of an intense sweet taste, so that in this respect it cannot be distinguished from cane-sugar. The crystals are quite transparent, hard, grate between the teeth like sugar-candy, of spec. grav. 1·654; at 59° F. they are rectangular octahedra, belonging to the system of the right rectangular prism. Water dissolves nearly twice its weight of this sugar; boiling alcohol takes up but very little, and again deposits it in crystals on cooling. A concentrated solution of this sugar resembled completely one of ordinary sugar; the saturated syrup had a density of 1·372 at 59°. Sorbine and its syrup are therefore both somewhat denser than in the case of cane-sugar. Sorbine cannot be set in fermentation by yeast at 68°–86°; dilute sulphuric acid does not alter its properties, and does not render it fermentable after being boiled with it for half an hour, nor does this treatment change its behavior towards polarized light. Concentrated sulphuric acid immediately attacks it; the sorbine first turns reddish-yellow, and then with a gentle heat is converted into a black mass; nitric acid converts it into oxalic acid, with copious evolutions of red fumes; like cane-sugar, it furnishes more than half its weight of oxalic acid. On analysis it furnished 40·000 per cent. carbon, 6·66 hydrogen, and 53·34; and its formula is either $C^{12}\,H^{12}\,O^{12}$ or $C^{12}\,H^{9}\,O^{9}$.—*London Chem. Gaz.*, from *Liebig's Annalen*, March, 1852.

On Dyeing with Sandal-Wood. By Anton Winner.—In order to dye as fine a red with sandal-wood as with madder, the author first exhausts the wood with boiling water. He then treats it with a cold filtered solution of chloride of lime as long as this becomes colored, and washes it perfectly with pure water. From the sandal-wood thus prepared the red coloring matter is extracted by a hot, but not boiling solution of soda, the wood being tied up in a linen bag; the kettle is to be covered with a well fitting lid. The extract should have a deep red color tending to violet. Cotton, linen, and woollen stuffs are prepared with acid mordants, and dyed in it in the usual manner. The author obtained a beautiful scarlet by alternately treating the stuffs with a mordant of chloride of zinc and the above bath. The colors are durable, and particularly useful in saving cochineal, as stuffs which are to be dyed with cochineal may previously receive a ground of the coloring matter of sandal-wood.—*Ibid*, from *Kunst und Gewerbebl. für Baiern*, 1852, p. 149.

Process for giving various Objects a Pearly Lustre. By O. Reinsch.—To produce the iridescence of mother-of-pearl on stone, glass, metal, resin-

paper, silk, leather, &c., Reinsch adopts the following process:—2 parts of solution of copal, 2 parts of that of sandarach, and 4 parts of solution of Damara resin (equal parts of resin and absolute alcohol) are mixed with half their volume of oil of bergamot or rosemary. This mixture is to be evaporated to the hickness of castor oil. If this varnish be then drawn by means of a feather or brush over the surface of some water, it will form a beautiful iridescent pellicle. This film is now to be applied to the objects which are to be rendered iridescent. The vessel in which the water is contained, on which the pellicle has been produced, must therefore be as large as, or larger than, these objects. The water should have about 5 per cent. of pure solution of lime added to it; its temperature should be kept at about 72°. The objects are dried in the air.—*Ibid*, from *Kunst und Gewerbebl. für Baiern*, 1852, p. 165.

Researches on the Constitution of Organic Acids. By M. Charles Gerhardt.—The experiments described in this communication were instituted with the view of establishing a general formula for organic acids, which should be to them what the formula for ammonia is to the organic alkalies. The author believes that water, the molecule of which he assumes to consist of 1 atom of oxygen and 2 atoms of hydrogen, may be taken as the type of organic acids, the two atoms of hydrogen being capable of being replaced by simple metals, or by complex groups, such as methyle, æthyle, &c. Reference is made to the results obtained by Dr. Williamson and M. Chancel, tending to prove that alcohol, ether, and their homologues, represent molecules of water in which the two atoms of hydrogen are partly or wholly replaced by complex groups; in accordance with which theory the compound formed by replacing 1 atom of hydrogen in alcohol by potassium may be considered as the potassium salt of a weak acid, æthylic acid, which gives rise to a chloride (hydrochloric ether or chloride of æthyle) when acted upon by perchloride of phosphorus. Reference is also made to the experiments of Cahours, proving that various organic acids, such as benzoic, nitrobenzoic, cuminic, anisic and cinnamic acids, experience similar changes under the influence of the same reagent.

Starting from this point, the author concluded, that, by imitating the well-known reaction æthylate of potassium on chloride of æthyle, but substituting the corresponding compounds of one of the above mentioned acids for those of æthyle, the anhydrous acids ought to be obtained—a result which was fully confirmed by experiment. With benzoate of soda and chloride of benzoyle the experiment succeeded perfectly well when conducted in the following way:—The soda salt was well dried and mixed with an equivalent weight of the chloride, and the mixture heated to 130° Cent., when it formed a limpid liquid, which at a temperature a few degrees higher underwent decomposition, the peculiar smell of the chloride of benzoyle disappearing, and chloride of sodium being deposited. The product, suspended in cold water, and washed with carbonate of soda, left a white substance without

odor and perfectly colorless, which was found on analysis to be *anhydrous benzoic acid*—

$$C^{14} H_5 O^3.$$

This new product crystallizes in oblique prisms, which melt at 33° C. It is volatile without decomposition, insoluble in water, but soluble in alcohol and ether, and these solutions are perfectly neutral. Boiling water transforms it by degrees into common benzoic acid.

Experiments were made in the same direction with other acids, the detailed account of which the author defers for a future communication.—*London Chem. Gaz.*

Note on Sarsaparilla. By Dr. F. L. Winckler.—Chatin finding iodine in Honduras sarsaparilla, believed that the remedial action of that root might thus be partially explained. Dr. Winkler has carefully examined several other varieties without success, and has been led to think that the root examined by Chatin must have been exposed to the action of sea-water. —*Central Blatt*, May 7th, 1852.

On Coccus Ilicis. By Dr. X. Landerer.—The *Coccinella septempunctata* is known in the East by the name Κρμιζι, and the Coccus Ilicis by that of Πρινοκκκι, the tree on which the latter insect is found, and from which it is collected, being called by the Greeks *Prinos*, that is the *Quercus coccifera*. As this tree occurs abundantly in Greece, and principally in the mountainous parts, these insects are also found here, but it is only in Peloponnesus, and almost exclusively in the neighborhood of Messena, that the inhabitants collect them. The insects are found adhering to the bark of the branches of this tree, and also immediately above the root, but very rarely on the leaves, and it is observed that those found near the roots of the tree are larger, and contain more coloring matter than the others. An active man may collect from six to ten ounces in a day. With the view of increasing the number of these insects, the people burn the small trees on the mountains, and in consequence of this bad management, sometimes set fire to whole forests. The ashes appear to fertilize the ground, and to be very favorable to the growth of the trees on which the insects are found. The Coccus looks like a small egg, which can hardly be distinguished on the young branches, to which it is attached by an envelope. In about three months it acquires the size of a pea. If the insects are not collected at the proper time, that is, about the middle of June, they burst the envelope and escape, leaving only the envelope, which is valueless, as it contains none of the coloring matter. The collectors cut off the branches on which the insects are found, with a hooked knife, which is made for the purpose, and afterwards separate the insects, which, still mixed with some of the leaves and flowers of the trees, constitute the first rough article of commerce. They are immediately exposed to the sun on sieves, by which means they are killed and preserved. The size varies according to

the vigor of the trees from which they have derived their nourishment. After being dried, the insects are separated from the leaves and other foreign matters with which they were mixed, and packed in small casks, in which they are transmitted to Marseilles, Malta, &c. The principal consumption of them is in the East, where they constitute the principal material used for coloring the red head-dresses used by the men in these countries. In order to increase the weight of the insects, they are sometimes sprinkled with red lead, which fills up any cavities, and red sandal-wood, and pea-flour, covered with a decoction of the insect, are also used for the same purpose. I have been assured by dealers in the article, that three or four per cent. of such adulterations may be added without their being easily detected. The insects collected in the above-named localities, are considered to be of better quality than those obtained from any other parts. About 40,000 pounds weight of them are annually collected in Greece. Those of the best quality sell at from 20 to 30 drachmas per pound. There is an inferior quality, which is sometimes exported in powder, but as this is more or less adulterated, there is little demand for it. This rarely finds its way into European commerce, but is generally sent to Tunis, where it is used with madder for dyeing the red turbans or head-dresses, of which great quantities are sent from Tunis to all parts of the East, and it is said that the color produced at Tunis is more durable than that produced by the Greeks. I have only to add, with regard to the medicinal use of these insects, that they are employed as a remedy for different diseases, especially scarlatina, and that they are administered in the form of infusion and of electuary.—*London Pharm. Journ.*, June 1, 1852.

On Gambir. By BERTHOLD SEEMANN.—Black pepper (*Piper nigrum*, Linn.) and Gambir (*Uncaria Gambir*, Roxb.) are grown in great quantities in Singapore, and exclusively by the Chinese, for both these articles are so exceedingly cheap that Europeans have not deemed it worth their while to engage in the speculation. Pepper and Gambir plantations are always combined, because the refuse of the Gambir-leaves serve as an excellent manure for the pepper; and moreover, what is of equal, if not of still greater importance, kills the Lalang (*Andropogon caricosus*, Linn.) a plant which, like the couch-grass (*Triticum repens*, Linn.) spreads with astonishing rapidity over the fields, growing so close together and so high, that within a short space of time valuable plantations are rendered useless, and many have to be given up from the utter impossibility of freeing the ground from this weed.

The process by which Gambir is extracted and prepared is simple. The leaves are boiled in water until all their astringent property is extracted. The decoction is then poured into another vessel, in which it becomes inspissated, and, when nearly dry, is cut into small square pieces,

and thus brought into the market. M'Culloch states that sago is used in thickening it. This, however, at least in Singapore, is not the case; but, instead of sago, a piece of wood is dipped into the vessel, by which the desired effect is produced. It must, indeed, be an extraordinary substance, the mere dipping of which into the fluid can cause it to become a thickened mass. I was very eager to obtain a piece of this wood; unluckily, the Chinaman whose laboratory I visited, could not be persuaded to part with his, and a friend of mine, who was exerting himself to procure a sample, had not succeeded at the time of the Herald's departure; he promised, however, to send it to England, accompanied by the Malayan name, and specimens of the tree.—*Ibid.*, from *Hooker's Journal of Botany.*

On the Production of Photographs on Glass. By J. PUCHER.—According to this process, a thin film of iodide of sulphur is formed upon plate glass, which must be perfectly clean, with a very thin coating of sulphur, and then impregnating this for a few seconds with the vapor of iodine. The glass plate is then placed in the camera, where at the same time the vapor of some quicksilver in an iron cup in the bottom of the camera acts upon the iodide of sulphur with which it is coated, and it receives the photographic image within a minute. The glass plate, when taken out of the camera, only exhibits a trace of the picture, but this immediately comes out on exposure to the action of the vapor of bromine. If the picture be now held over alcohol, and some of the same liquid be poured upon it, it will be fixed. Not more than from five to eight minutes are required for the whole operation.

The glass plates must be breathed upon and well rubbed with a soft linen rag several times before use. They are coated with sulphur by burning sulphur sticks, made on purpose, in a proper tube, and holding the plates over it at a distance of about 3 inches. These sulphur sticks are prepared by dipping pieces of rush-pith into a melted mixture of sulphur and mastic, with which they become incrusted. For use, these sulphur sticks, which are about the size of a lucifer match, are stuck on a brass needle, introduced into the middle of a glass tube and kindled, so that the vapor of the sulphur may come in contact with the glass plate held over it.

These glass plates are so sensitive, that the coating of iodide of sulphur becomes instantly changed on exposure to direct sunlight, and give a Moser's image within five minutes when laid in a book. The figures thus obtained are most easily read by candle-light. In daylight, the blue letters can be recognized on the yellow ground only by looking through the plate towards the middle of the window, or towards a sheet of paper fastened in that place, the sulphur not having been removed either by vapor of bromine or by alcohol.

If a glass plate covered with a solution of gum and exposed to the vapor of iodized sulphur, be placed in the camera, a positive picture, with all its

details, is obtained, the outlines of which can be laid bare by an etching-point capable of scratching the glass. If a glass plate, so marked, be rubbed in with printing ink, the outlines will be filled, and the ink will remain in them when the glass is freed from the coating of gum by means of water. The picture is then easily transferred to paper, which is to be laid on the plate and rubbed over with a paper-knife.—*London Chem. Gaz.*, from *Archiv der Pharm.*, lxix. p. 301.

On Gallic Acid Fermentation. By M. Robiquet.—Gall-nuts contain, besides tannin and the several principles which have already been pointed out by chemists, pectose and pectase. The latter ferment, which exists both in the soluble and in the insoluble state, acts at the same time upon the pectose and upon the tannin, converting the first into pectine and the second into gallic acid. The presence of water and a temperature of 77° to 86° F. are requisite for this reaction, which resembles in every respect the ordinary phenomena of fermentation.

The ordinary tannin, which has been prepared with ether, contains sufficient pectase to pass spontaneously in the presence of water into gallic acid; but if care has been taken to purify it, or if its solution has been simply boiled for a few minutes, the change no longer takes place.

Synaptase, yeast, vegetable and animal albumen, and legumine have a very doubtful action upon tannin, and retard rather than accelerate its conversion into gallic acid.

It is quite as easy to convert the pectine of fruits into pectic acid by means of the pectase obtained from gall-nuts, as to convert tannin into gallic acid with pectase separated from the juice of fresh roots, and especially from turnips.—*London Chem. Gaz.*, from *Comptes Rendus*, July 5, 1852.

On the Manufacture of Gas from Wood. By Dr. Pettenkofer.—Two years ago, Dr. Pettenkofer showed by experiment, at a meeting of the Polytechnic Institute of Bavaria, that a very considerable amount of illuminating gas could be disengaged from 2 oz. of wood. Its practicability on a large scale has since been the subject of much doubt. The inventor's process is now in operation at Basle, and it is also about to be introduced at Zurich, Stockholm and Drontheim. The process is said to be far less expensive than the manufacture from fossil coal, and furnishes a gas which is free from sulphuretted hydrogen, and several useful collateral products, as charcoal, wood-tar and wood-vinegar.—*London Chem. Gaz.*, from *Central Blatt.*, March 10, 1852.

On the Galbanum Plant. By F. A. Buhse.—The author states, that in his travels in Persia he discovered the plant which yields galbanum. In June, 1848, he found it on the declivities of the Demawend. It is a ferula, from the stalks of which a liquid issues abundantly, by the odor and nature

of which he immediately recognized galbanum, and his guides assured him, moreover, that galbanum is gathered from this plant. The author has not yet distinctly determined the plant. It appears to differ from *Ferula erubescens* (*Annales des Sciences*, iii., Sér. 1844, p. 316) only by the absence of commissural vitæ; but as neither Aucher-Eloy nor Kotschey, who have both collected the Ferula erubescens, make any mention of its yielding galbanum, the author is in doubt whether his plant be the same, or a variety of it. Don's genus Galbanum (Trib. Sibrinæ) and Lindley's Opaïdia (Trib. Smyrneæ) do not agree with the plant seen by Buhse, unless thatboth of these authors have made their descriptions from imperfect fruits, or that there exist other plants which yield galbanum. The plant which Buhse describes is called, in some parts of Persia, *Khassuch* (not *Kasneh*, which means Cichor. intybus, nor Gäshnis, which is Coriand. sativum), and appears to be confined to certain districts of Persia. In the whole large district of the Elburs-chain, from the south-east angle to the south-west angle of the Caspian Sea, it is only found in the neighborhood of the Demawend; but here at an elevation of from 4000 to 8000 feet, and even on the declivity of the top of the Demawend. It exists neither on the mountains of Talysch, nor in the districts of Caradagh and Tabris. It is said to re-appear on the Mount Alwend, near Hamadan, and in the neighborhood of the great salt-desert. Near Hamadan Aucher-Eloy has gathered his Ferula erubescens, and this supports the supposition that the author's plant is the same. In the salt-desert itself Buhse did not meet with it again. The inhabitants of the Demawend collect the gum-resin, which issues spontaneously from the lower part of the stalk; they do not make incisions in the plant; but it is not at this place that the galbanum is collected for commercial purposes. When fresh, the gum-resin is white like milk, liquid, and somewhat glutinous. In the air it soon becomes yellow, elastic, and finally solid. The odor is rather strong, unpleasant, and similar to that of our commercial galbanum.—*London Pharm. Journ.*, from *Central Blatt, für* 1852, No. xiii.

Improvement in the Quick Process for Manufacturing Vinegar. By Anton Wimmer.—Instead of wood shavings, Wimmer employs in the manufacture of vinegar, pieces of charcoal of the size of a walnut, and which have been deprived of their saline matter by diluted muriatic acid, and afterwards washed with water. The charcoal effects the oxidation of spirit of wine in a much shorter time than the wood, and is not so soon spoiled by the formation of mother of vinegar. With charcoal, the operation can be performed, even on a very small scale, and vinegar may thus be prepared in glass bottles.—*London Pharm. Journ.*, from *Pharm. Central Blatt.* 1852, No. xiv.

Editorial Department.

The Convention of 1852.—The following call to the Convention about to meet in this city is introduced, notwithstanding the few days that will elapse before the meeting to which it points:

"Notice—The annual meeting of the U. S. Pharmaceutical Convention will take place in Philadelphia, on Wednesday, the 6th of October, 1852.

It being a matter of much importance that this meeting should number as many of our Druggists and Chemists as possible, I deem it proper to suggest that not only all regularly incorporated and unincorporated associations of this kind should see that they are fully represented, but that where no associations exist as yet, the apothecaries should send one or more of their number as delegates to the Convention,—such will, no doubt, be cheerfully admitted to seats in the Covention.

We trust all who feel an interest in this important subject, will remember the time and place, and give us their assistance in person or by delegate.

C. B. Guthrie, *President of Convention.*"

The following resolutions have been passed by the Board of Trustees of the Philadelphia College of Pharmacy, Sept. 20th.

"Resolved, That the hall of this College be placed at the disposal of the Pharmaceutical Convention about to assemble in this city during the time they may need it.

Resolved, That a committee of three be appointed to make arrangements for the convenience and comfort of the members of the Convention whilst they are in session."

The Committee of Arrangement consists of Wm. Procter, Jr., Alfred B. Taylor, and Edward Parrish, to whom members of the Convention desiring information are invited to apply.

The Hall of the College is in Zane street above Seventh, a central location, and well fitted for the purpose. As no hour was set in the minute of adjournment last year, it is proposed that the time shall be four o'clock P. M., on the 6th of October, which will admit of our New York and Baltimore friends leaving home in the morning. As there will have to be a preliminary meeting of delegates only, the full sittings will probably commence on the morning of the 7th, when the consideration of the important subjects of future organization, Pharmaceutical Education, Pharmaceutical Ethics, and the means for the advancement of pharmaceutical science, will come before it.

THE NEW YORK JOURNAL OF PHARMACY.—The Editor of the New York Journal of Pharmacy deems it an unusual course on our part to notice, under the head of "Pharmaceutical Notices," a series of articles of the same general character which appeared in that Journal, with comments. We disclaim all intention of discourtesy or unfairness in thus remarking on the articles in question, our only reason for abridging them being to comprise them within a reasonable space. It is due to Messrs. Coggeshall and Dupuy that their explanations and reclamations should be presented to our readers, and we give them below.

COMMENTS ON "COMMENTS."—The American Journal of Pharmacy, (Philadelphia) for July, contains "Pharmaceutical notices, being extracts from various articles in the New York Journal of Pharmacy, with comments by the editor," in which our friend Procter, criticises, rather severely, some of the pharmaceutical formulæ and suggestions that have been offered in this Journal. With full respect for the great acquirements and high character, as a practical pharmaceutist, to which my friend Procter is justly entitled, I should have been glad if the articles, upon which he comments, had met his approval; and I know of no one that I would rather should set me right, if anything that I have offered does not find acceptance with him. With the greater part of his comments, I do not think there is occasion for controversy,—matters of fact readers can judge for themselves, and it certainly is of little consequence, who may be found in error, compared with the elucidation of truth.

In respect to the *consistence* of Syrup of Gum Arabic, he is probably nearer right, (during this hot weather, at any rate,) than I was, and still, I think he is not right. My experience with the present officinal formula, had been in the cold season, when I found the syrup decidedly too thick for convenient use, especially by itself; a large proportion of it crystallized in the temperature of the shop, and the mouth and neck of the bottle choked up with candied syrup every two or three times it was used. I had found the former syrup to answer very well in regard to consistence and flavor, though, it certainly could not be considered permanent; it had to be made in small quantities and frequently; indeed, I do not suppose that any liquid combination of gum, sugar and water only, can be made of a permanent character. Since reading Mr. Procter's comments, I have made this syrup again by the present formula, and it does keep decidedly better at this season, than that made in the other proportions, yet not perfectly; and there is considerable crystallization, even in the very hot weather we have had lately. I infer that syrup which crystallizes at this season, has an excess of sugar in it, the crystals formed tending further to reduce the remaining syrup and thus sooner promote acidity than if a proportion of sugar had been used which could remain in solution. Perhaps, a medium between the two formulæ could be hit upon, in which the proper balance might be better attained.

In the formula offered for Compound Syrup of Squill, in our Journal for April, there is an error of four ounces in the quantity of honey, which should have been *twenty-two* ounces. Whether it was made by the printer or not cannot be ascertained, as "the *copy* has been destroyed." I had not noticed it until my attention was called to it by Mr. Procter's comments. The quantity of sugar used by me in making this syrup was, for convenience, one pound avoirdupois weight; that of honey, one pound and a half, same weight. In transcribing the formula for a medical journal, I thought I must, per custom, render it in troy weights; so as 15 oz. troy are 200 grs. more than one pound av., I set down 15 oz., and intended to set down 22 oz. of honey, as being only 60 grs. more than one pound and a half av. I think this addition of 4 oz. of honey will make the whole come up to Mr. Procter's measure of "56 fluid ounces before the ebullition," &c., and a little over. The boiling can be continued only for a few minutes. I was formerly in the practice of boiling to three pints, and adding 48 grs. tartar emetic, but finding that I had to evaporate more than half a pint, and judging that the strength of the resulting preparation was rather lessened than increased thereby,

I concluded to stop at three and a half pints. As to the proportion of sugar and honey, they amount to 2½ pounds av., which, with two pints of an evaporated menstruum, containing the extractive matter soluble in diluted alcohol of 8 oz. of the roots, furnishes a syrup of good consistence. It may be observed, that solution of sugar in a menstruum so charged, is quite different from that in water. Perhaps, however, an equal amount of sugar with that of the honey, would be preferable. I can only say, that I employed the same quantity a number of times, but reduced it several years since, because it appeared to be too much for some reason, the particulars of which I do not recollect. And as this formula has always given me a satisfactory preparation, I have thought no more about it, until now. Or perhaps, it would be better to continue the evaporation to three pints, with the advantage of producing a more symmetrical result, corresponding, at the same time, with the quantity of the Pharmacopœia. But, is not the officinal formula "almost as far out of the way" the *other* way? Forty-two oz. of sugar in forty-eight fluid oz. of syrup! Can such an amount remain in solution twenty-four hours at any ordinary temperature? If mine is an "*anomaly*," is not this an *impossibility*, "in point of consistence?" In reference to the alcoholic objection, it may be remarked, that the evaporation in the case commented upon, is not "from 4 pints of tincture to 2 pints," but from 4¾ pints to 2 pints. The small portion of alcohol, that may remain after this evaporation and the continued heat to the end of the process, can scarcely be of serious consequence in the doses in which it is proscribed; it may have some influence in preserving the syrup, and also in promoting its medical action. Be all this as it may, so far as taste is a criterion, this preparation appears to be of at least double strength in the qualities of both roots, of the officinal syrup carefully made by the second process given,—the first being, as I suppose, with all apothecaries of the present day, "an obsolete idea."

G. D. C.

There are details applicable to many of the processes of our National Pharmacopœia, which are left to the knowledge and judgment of the apothecary. To be otherwise would make that work more a treatise on practical pharmacy than a pharmacopœia, and in all countries it has been left for commentators to point out many things which should be known to the operator who uses it as a guide, yet we believe that a little more minuteness of detail in some of the formulæ would be useful. In preparing the syrups of the Pharmacopœia requiring heat, many operators forget to make allowance for the loss by evaporation, which usually occurs when open vessels are used. If it was more the custom to employ the saccharometer, and add water to make up for the deficiency of menstruum, or to perform the operation in close vessels, so that the vaporized moisture should be returned to the syrup, as well as to strain them in covered vessels, and finally to keep the syrups as near the temperature of 60° F. as is practicable, we think there would be less cause to complain of the separation of sugar from the officinal syrups, or of their fermenting.

We have not found the sugar to separate from Syrup of Gum Arabic to much extent, even in cool weather, by observing these rules. There is a small excess of solid matter in that syrup, but the gum retards the crystallization of the slight excess of sugar, and it is better to have that excess than a fermenting syrup.

As regards compound Syrup of Squill, we are satisfied that the proportion of sugar is correct, and that it will remain dissolved, unless the temperature is reduced too low: or a part of the menstruum lost by evaporation:

or a portion of alcohol be present; in either of which cases the sugar will tend to separate. The substitution of sugar, for honey, was generally esteemed an improvement. We should be glad if our friend Coggeshall could find the pharmacopœia sufficiently near *right* in these, as in many other instances, to claim for it his support.

Remarks on the Comments made by the Editor of the American Journal of Pharmacy, on some extracts from various original articles, published in the New York Journal of Pharmacy.—After giving the formula for preparing Stramonium Ointment, as modified by E. Dupuy, the editor of our cotemporary adds, "the objection to the officinal formula on the score of color, is hardly valid, and if it was so, it would be better to color it with extract of grass, than to substitute a preparation which will constantly vary in strength and appearance or with the age of the leaves. The officinal extract of strammonium is easily incorporated with lard, and produces a brown colored ointment of comparatively uniform strength." We do not pretend to have furnished a formula vastly superior to that received in our officinal guide. But as we were writing for our locality chiefly, and knowing the general expectation and usage of furnishing stramonium ointment of a green color, we have given a formula which does furnish an ointment having the proper strength, requisite color, without the loss of time and material necessarily incurred in manufacturing a color ad hoc as suggested by W. Procter, Jr., which from the contamination of the decomposed chlorophylle of the extract, would never comparefavorably (notwithstanding all that useless waste of trouble,) so far as its appearance is concerned, with the far readier mode proposed for transforming at once by a few short manipulations the dry strammonium into an alcoholic extract and ointment without liability to alteration during the process. Respecting the keeping of both ointments, we can affirm that the one prepared by the modified formula, will keep as well if not better and longer than the other, and as the color is a point of some importance for our public and practitioners, we are satisfied that it will be preferred on the score of economy of time as well as for its color, which is desirable at least within our circle of custom.

Emplastrum Epispasticum with Camphor and Acetic Acid.—Mr. Procter objects to the addition of acetic acid to the officinal blistering cerate, and seems to smile at the idea of fixing by it the volatile principle of the cantharis, which, by the way, he gratuitously makes the author to say is a neutral substance, when he says not a word about it. He quotes the authority of Mr. Redwood, who in the Pharmaceutical Journal, October, 1841, speaks of acetic acid as not being a good solvent for cantharidine. The reason is, in all probability, from the fact of his using the London standard strength, which is but 1.48. For Messrs. Lavini and Sobrero, (Memoire lu a l'academie des sciences de Turin, 9 Mars, 1845,) state that "concentrated acetic acid dissolves cantharidine, but more readily under the influence of heat." Respecting the volatility of cantharidine, these same chemists have stated in the same paper "that while manipulating with but 52 grammes of flies, for the researches they were making on cantharidine, one of them suffered from blisters produced on the face and lips by the emanations from these insects." Besides their authority, Soubeiran, in his Traite de Pharmacie, and Dorvault in the Officine, both state that cantharidine is a very volatile substance, even at ordinary temperature, and if that is, as it appears to be, the case, what reliable information have we that only 1-30th of a grain was volatilized in the experiment mentioned by W. Procter, Jr., made with 100 grs. of powdered cantharides? Is it not very probable, that in removing the hygrometic water, much more was lost.

Whatever may be the changes which take place by the addition of acetic acid in a concentrated state, it is a fact, proved by experience, that the blistering plaster thus prepared keeps better—that is, retains its power longer than the officinal one even exposed to the air in thin layers. . As an example of the stability of this combination we have *Brown's Cantharidine*, which, to all appearance, is made from an etherial extract of cantharides additioned with concen-

trated acetic acid and incorporated in melted wax. We find such a mixture, although spread on paper and but imperfectly protected from the air, retaining for a long period its vesicating properties. Is this advantage produced by a simple acid saponification of the cerate, without reaction on the active principle, but that of protecting it from atmospheric influences? We think it probable that there is a modification taking place, both on the cantharis and other components of the cerate. E. D.

In reference to Mr. Dupuy's Stramonium Ointment we have little to remark. In the United States Pharmacopœia this ointment is viewed as an extemporaneous one, to be prepared when prescribed, as the small proportion of the ingredients will indicate. In regard to the medicinal activity of Mr. D.'s ointment we perhaps should not undertake to decide; yet we have some reason for doubting the efficiency of an oily menstruum for malate of daturia, inasmuch as the ointment, made carefully according to the United States Pharmacopœia of 1840, can be eaten with avidity by mice. When the extract of stramonium leaves of the Pharmacopœia, which Mr. D. should recollect contains no chlorophylle at all, much less "decomposed chlorophylle," is incorporated with eight times its weight of lard, we *know* that the strength is there.

In relation to Mr. Dupuy's remarks on our criticism of his blistering cerate, we will refer him, and those who may feel any interest in the matter, to the article on Cantharides at the beginning of this number. We are willing to commit the applicability of the facts therein contained to the subject at issue, to the candor of Mr. Dupuy, believing that they bear us out in the positions taken, that acetic acid does not fix cantharidin, and that that principle is not so volatile as some authors have stated it to be. We quoted Mr. Redwood in opposition to the solubility of cantharidin in acetic acid. How far he is incorrect will be seen in the paper at page 295. If Mr. Dupuy, at line third of his article on blistering cerate, (New York Journal of Pharmacy, vol. i. page 72,) does not term cantharidin a "*neutral substance*," we will have to believe that the copy of that journal in our possession is not genuine.

Richmond Pharmaceutical Society.—In answer to a query respecting the progress of that Society, we have received the following communication from one of its members. It is very gratifying to witness thus early the good results of a harmonious effort of a small body of apothecaries, because it is an encouragement to similar efforts in other communities.

"We are happy to be able to announce that this Society went into successful operation about three months ago. A constitution and by-laws have been adopted. Meetings of a purely scientific character are held regularly once a month, on which occasions members, appointed for the purpose, read essays upon pharmaceutical subjects. The first of these, an essay on the process of displacement, illustrated by numerous painted diagrams of apparatus, was read at the September meeting. Scientific discussions are also held.

A committee has been appointed to form a library for the Society; and another to obtain specimens of the Materia Medica.

From the enterprise and zeal its members have already exhibited, it is not too

much to hope that ere long Pharmacy will have in this Society an advocate that will prove valuable in advancing pharmaceutical interests, in promoting a knowledge of of the sciences connected with pharmacy, and in elevating the standard of practice.

The following are the officers of the Society:

President—Alexander Duval,
1st Vice do.—James P. Purcell,
2d do. do.—J. B. Wood,
Recording Secretary—Chas. Millspaugh,
Corresponding do.—S. M. Zachrisson,
Treasurer—W. S. Beers,
Librarian—J. Taylor Gray.

Delegates to the National Convention at Philadelphia.

Alexander Duval, John Purcell, Joseph Laidley."

A proper Rebuke.—Some months ago, we noticed the promulgation of a code of ethics, modelled after that of our College, by the Richmond Medical Society, which was signed by all the apothecaries of Richmond, but two. One of these, in a recent advertisement widely circulated on the cover of a quack pamphlet, uses the following language: "The Richmond Pharmaceutical Society, lately organised here for the purpose of higher education, promotion and interchange of knowledge, as well as for the purposes to free the Apothecary from the slavish laws dictated to him by the members of the medical society, an act which would not have been tolerated in a Monarchy, much less in a Republic, have honored me with the appointment of secretaryship for European correspondence; I am therefore placed in a situation to remain always well informed of new inventions made in Europe, in our art."

The Society, justly indignant at such a base use of their name, passed the following resolutions, which we cut from the "Richmond Republican" for August 30th, 1852:

"At a meeting of the 'Richmond Pharmaceutical Society,' held at their rooms on Friday evening, the 27th August, the following resolutions were unanimously passed:

1. *Resolved*, That the use, by any member, of the name of the Society, to give expression to his personal feelings towards physicians or others, is highly improper, and will meet with our unqualified disapprobation.

2. *Resolved*, That the use of the offices of the Society by any of its officers for their personal benefit, is highly reprehensible and deserving the severest censure and penalties.

Alex. Duval, President.

Chas. Millspaugh, Rec. Sec.

Pharmacy in Portsmouth, Virginia.—No real progress can be expected in the pharmacy of a place where physicians compound their own prescriptions. On the contrary, the separation of pharmacy from the practice of medicine is a sure indication of the advancement of the former. We give place to the following extract from a Portsmouth paper, forwarded to us by Mr. Campbell, a graduate of pharmacy recently located in that town, with the more pleasure that it evidences such an improvement in the condition of our art, that physicians are willing to give up the important

though troublesome business of extemporaneous pharmacy to the apothecaries:

To the Public.—The undersigned, practicing Physicians in the town of Portsmouth, after consultation, have come to the conclusion to discontinue the furnishing of medicines to their patients after the 15th of the present month. Patients will be required to procure the necessary medicines from the Apothecaries.

John P. Young,
J. N. Schoolfield,
Geo. W. O. Maupin,
John W. H. Trugien,
James Gregory Hodges,
John W. Garlick,
R. H. Parker.

American Journal of Pharmacy.—The Publishing Committee have recently examined into the condition of the stock of volumes of the Journal, and find that they can furnish sets from the 8th volume or (2d of the new series) to the present time inclusive, amounting to seventeen complete volumes. The first of the new series, or seventh from the beginning, is out of print. Anterior to that they can supply the 6th, 5th, 4th and 3d volumes of the old series, whilst the 2d and 1st are out of print. The Committee are desirous of purchasing copies of the 1st, 2d and 7th volumes, and will either pay the price of publication or exchange recent volumes for them. Believing that the Journal embodies a very large amount of valuable information, comprehending in fact a faithful record of the gradual developement of pharmaceutical science during the period of its issue, now twenty-four years, both in Europe and America, the Committee consider that no pharmaceutical library should be without it. They therefore now, for the first time, offer the back volumes to the 20th inclusive, at the reduced price of $1.50 each, nett, which places them within the reach of almost any man in business. Besides the abstract and applied science embraced in this work, a very large number of formulæ are contained in it, including many that, though not officinal, are more or less valuable and in use. They therefore hope that the attention of the recent subscribers will be attracted to the subject, and that they will be induced to complete their sets as far as practicable.

Library of the Philadelphia College of Pharmacy.—Owing to the pecuniary difficulties which for many years past, this institution has been laboring under, its Library has in a great degree been neglected. In view of the present brighter aspect of its affairs, the Library Committee have solicited and obtained from the Board a moderate appropriation, to be devoted to the Library in the way chiefly of binding and completing works. As in a pharmaceutical library old works of the 18th, 17th and 16th centuries are particularly appropriate, as forming a fund of authorities useful to investi-

gators, the Library Committee now make the appeal to the members, and others who may feel interested, who have in possession works of the kind, that they do not particularly value, asking their donation to the College. The Committee in doing so believe that many valuable stores of volumes may be thus placed where they will prove useful, instead of mouldering away in garrets and closets almost unknown to their possessors.

The Committee also hope before long that they will be able to commence a system of annual purchases of standard works bearing on pharmacy, which will give greater practical usefulness to this important though long neglected department of the institution.

The Cabinet.—It has been but a few years since the attention of the Board of Trustees was directed to the importance of having a museum of specimens in Materia Medica, Chemistry, Botany, and Pharmacy, belonging to the institution, as a fit depository for the donations which from time to time have been received, and as a collateral advantage to the School of Pharmacy. The Committee having charge of the subject have partially availed themselves of the opportunities that have presented for getting contributions. They hope that the many graduates of our College who are scattered over the country will remember to forward to them objects of interest, which will prove useful and interesting.

The *Herbarium* of the College, though just being commenced, bids fair to be a valuable collection.

Die Polytechnische Centralhalle is the title of a weekly scientific journal, published in Leipsic, a specimen number of which we have received from Fr. W. Christern, 232 Chestnut street. As its name indicates, it is designed for artisans and manufacturers, and its subscription price is very low. Dr. Kerndt, of the University of Leipsic, is the Editor.

Among the contents of this number we notice—

Note on natural soda.

On the means of obtaining sugar from the sugar-cane and beet.

On the solders for workers in metals.

On a machine for grinding colors.

On the preparation of flax.

On paper from refuse cotton.

On bleaching sponges.

On welding cast and wrought iron, &c.

Thomas's Mechanical Leech.—The agents for this instrument, Harris, Hale and Co., have sent us a box containing two of these simple little instruments. Although called a "leech," it is in fact a tubular cupping instrument, with the mouth from one fourth to three fourths of an inch in diameter. Over the opposite end of the tube a sack of India rubber is tied

with wire, the sack entering the tube. In using the instrument the part to be "leeched" is scarified with a lancet, the rubber sack forced down into the tube by a plunger, so as to expel most of the air, and the open end then applied over the part. On removing the piston the contraction of the sack creates a partial vacuum, which acts on the scarified part, drawing the blood as in a cupping glass. How far it is capable of acting as a substitute for the disagreeable though effectual action of the little animal, we are unable to say, not having seen them tried. Several other forms of apparatus, on the same principle, are made by Mr. Thomas, as may be seen by reference to the advertising sheet.

Pharmaceutical Meetings.—The first Pharmaceutical meeting of the season took place on the 6th of September, on which occasion the meeting adjourned to meet on Tuesday the 5th of October, the evening previous to the meeting of the Convention, so that any members of that body who may be in the city may be invited.

We will take this occasion to remind the Members and Graduates of the College resident in Philadelphia, that the meetings will be held on the first Monday of every month following, to May next, inclusive.

The Delegates to the Convention, as far as heard from, are as follows:

Philadelphia College of Pharmacy.

Daniel B. Smith,
Charles Ellis,
William Procter, Jr.

New York College of Pharmacy.

George D. Coggeshall,
William Hegeman,
L. S. Haskell.

Massachusetts College of Pharmacy.

Joseph Burnett,
Samuel A. Colcord,
Samuel R. Philbrick.

Richmond Pharmaceutical Society.

Alexander Duval,
John Purcell,
Joseph Laidley.

Dr. Guthrie's Report was received too late to insert it among the selected matter in the fore part of the Journal, which will explain why it was put in small type under the head of *Varieties*.

We have received the following pamphlets from their authors:

Report made to the Hon. Thomas Corwin, Secretary of the Treasury, by Prof. R. S. McCulloch, of his operations at the Mint of the United States, in refining California gold by his zinc method.

Letter of Prof. R. S. McCulloch in reply to the report of the Director of the Mint.

An Address delivered before the Medical Society of Virginia at its 27th annual meeting held in Richmond, April 1852. By Beverly R. Wellford, M. D., etc. President of the Society.

Erratum.—At page 314, in the article "Pharmaceutical Apparatus," the first paragraph, second line, should read thus: "We described a mill intended for the apothecary's use, *by which comminution*, laboriously and," &c. The words in italics were accidentally omitted, and our readers will please to note the missing words on the margin.

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